STEREO INTEGRATED AMPLIFIER

A-82

SERVICE MANUAL

KENWOOD

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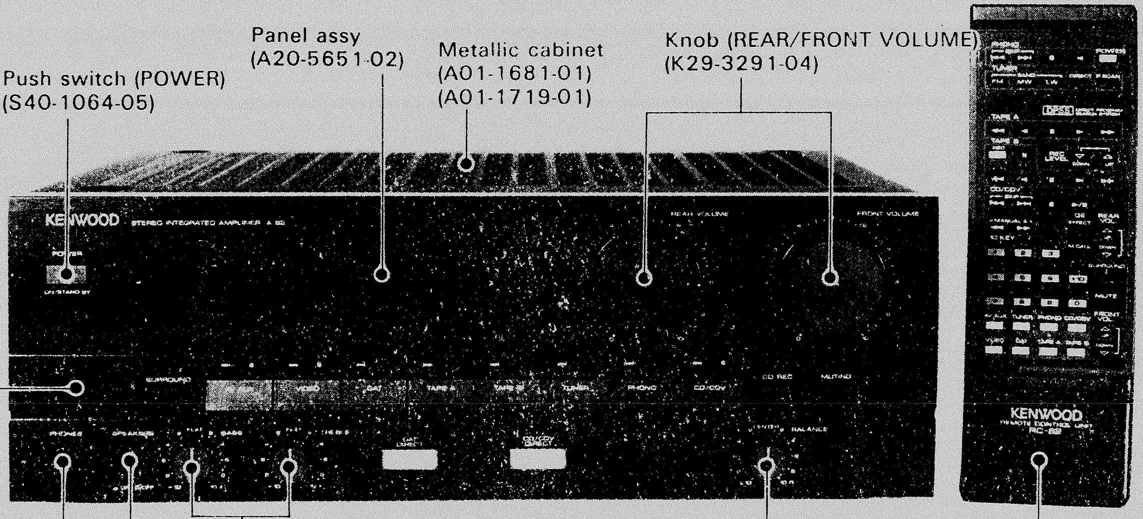
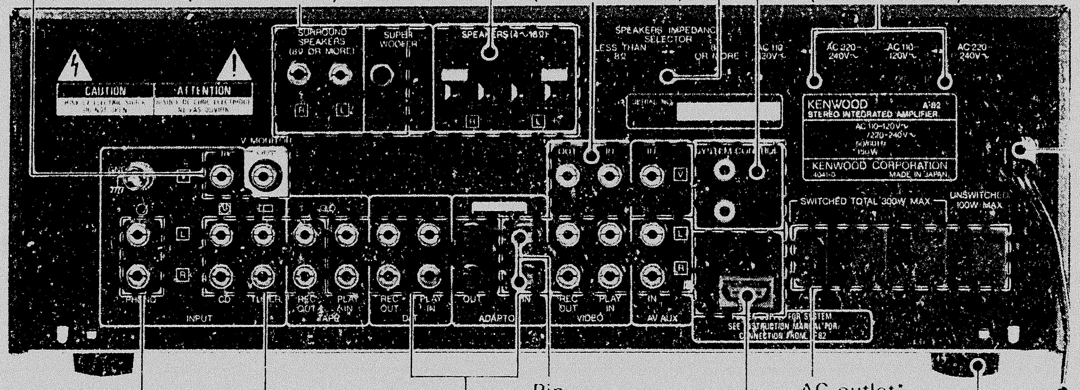
B51-3609-00 (G) 1663


Panel assy
(A20-5651-02)
Metallic cabinet
(A01-1681-01)
(A01-1719-01)
Knob (REAR/FRONT VOLUME)
(K29-3291-04)
Push switch (POWER)
(S40-1064-05)
Dressing plate
(B03-2473-04)
Phone jack
(E11-0162-05)
Knob
(SPEAKERS)
(K27-1914-04)
Knob
(BASS/TREBLE)
(K29-2506-14)
Knob (BALANCE)
(K29-2506-14)
Remote controller assy
(A70-0230-05)
(A70-0247-05)


Slide switch
(SPEAKERS IMPEDANCE)
(S31-2136-05)
Phono jack (CDV MONITOR)
(E13-0297-05)
Lock terminal board
(E20-0459-05)
Miniature phone jack (CONTROL)
(E11-0188-05)
Phono jack
(SURR SP, SUPER WOOFER)
(E13-0314-05)
Phono jack
(AU AX VIDEO)
(E13-0309-05)
Slide switch
(POWER TYPE)
(S31-2131-05)
Power cord bushing
(J42-0083-05)
Phono jack (2P)
(PHONO)
(E13-0235-05)
Phono jack (6P)
(CD, TUNER, TAPE)
(E13-0621-05)
Phono jack (8P)×2
(TAPE, DAT, ADAPTER, VIDEO)
(E13-0814-05)
Pin
(J12-0091-05)
AC outlet*
(E03-)
Rectangular receptacle
(E08-0411-05)
Foot (J02-0366-15)
AC power cord*
(E30-)

* Refer to parts list on page 47.

CONTENTS

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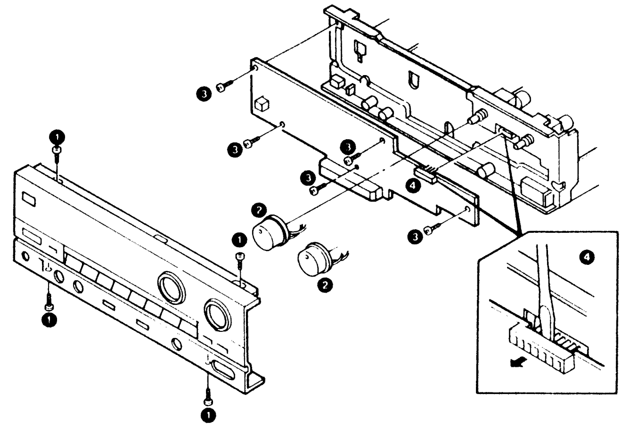
SPECIFICATION .... Back cover

CAUTION

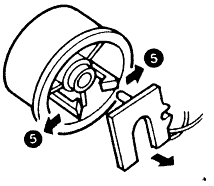
- The AC power supply for the X-91 on the rear panel outputs 16 V AC. Therefore, it cannot be used for supplying AC power to the X Series.
- In addition to conventional audio circuitry, this unit is equipped with 4 video input systems and 2 video output systems.

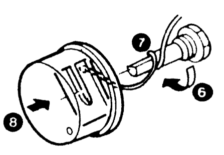
DISASSEMBLY FOR REPAIR

1. Remove the 4 screws (❶) fixing the front panel.
2. Remove the 2 Volume control knobs (❷). As LED cords are connected to them, take care not to pull them too violently.
3. Remove the 5 screws (❸) fixing the Switch Unit and disengage its connector (❹) as shown in the illustration.

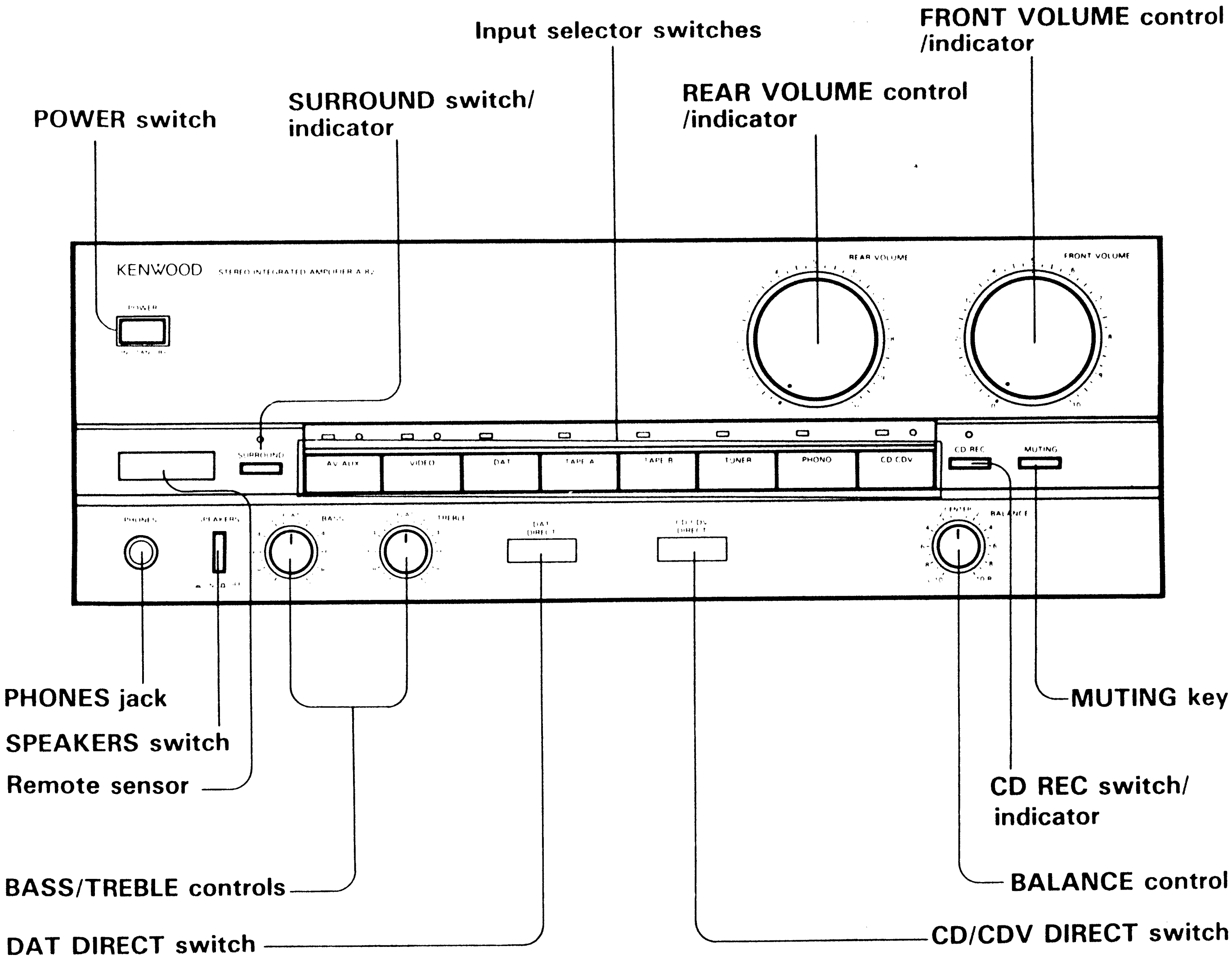


4. Disengage the 2 claws (❺) retaining the Volume control LED Unit, and take out the PC board.
5. When attaching the Volume control knobs to the VRs, set each VR to the maximum position (❻), wind the cord once around the shaft (❼), then insert the control knob (❽).

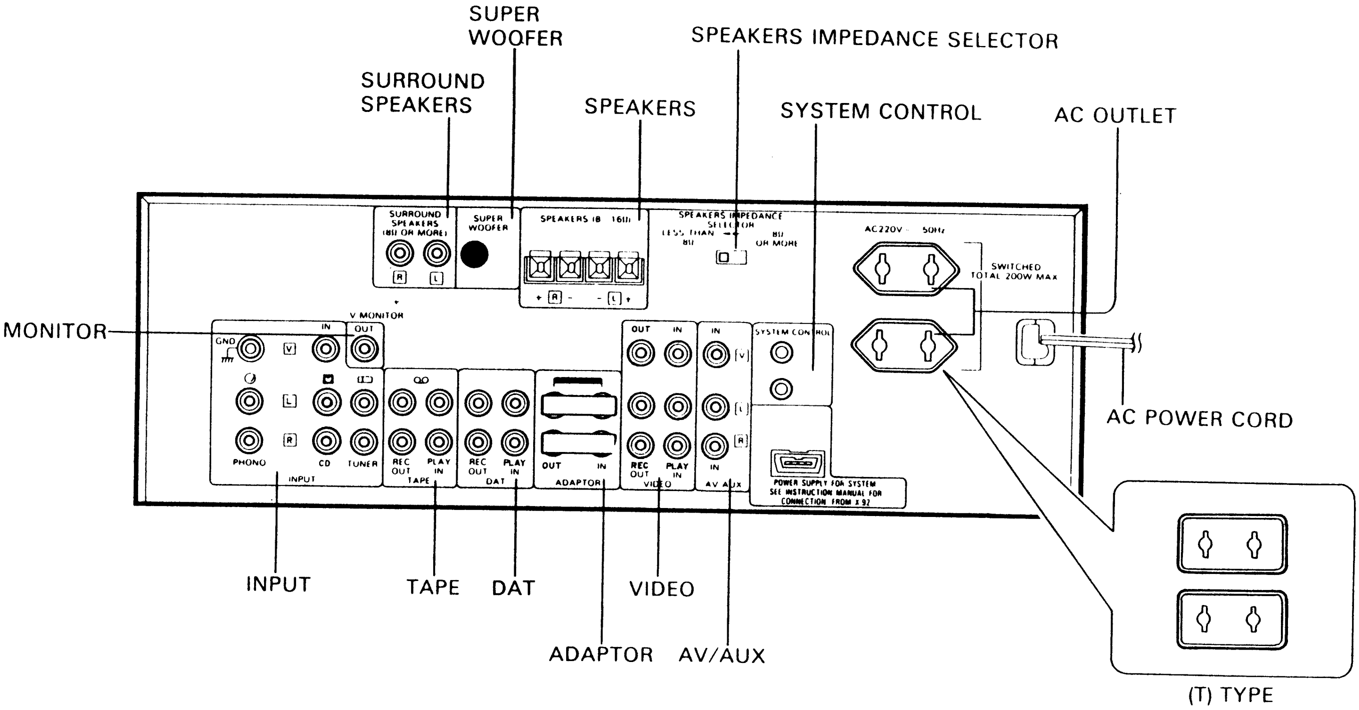




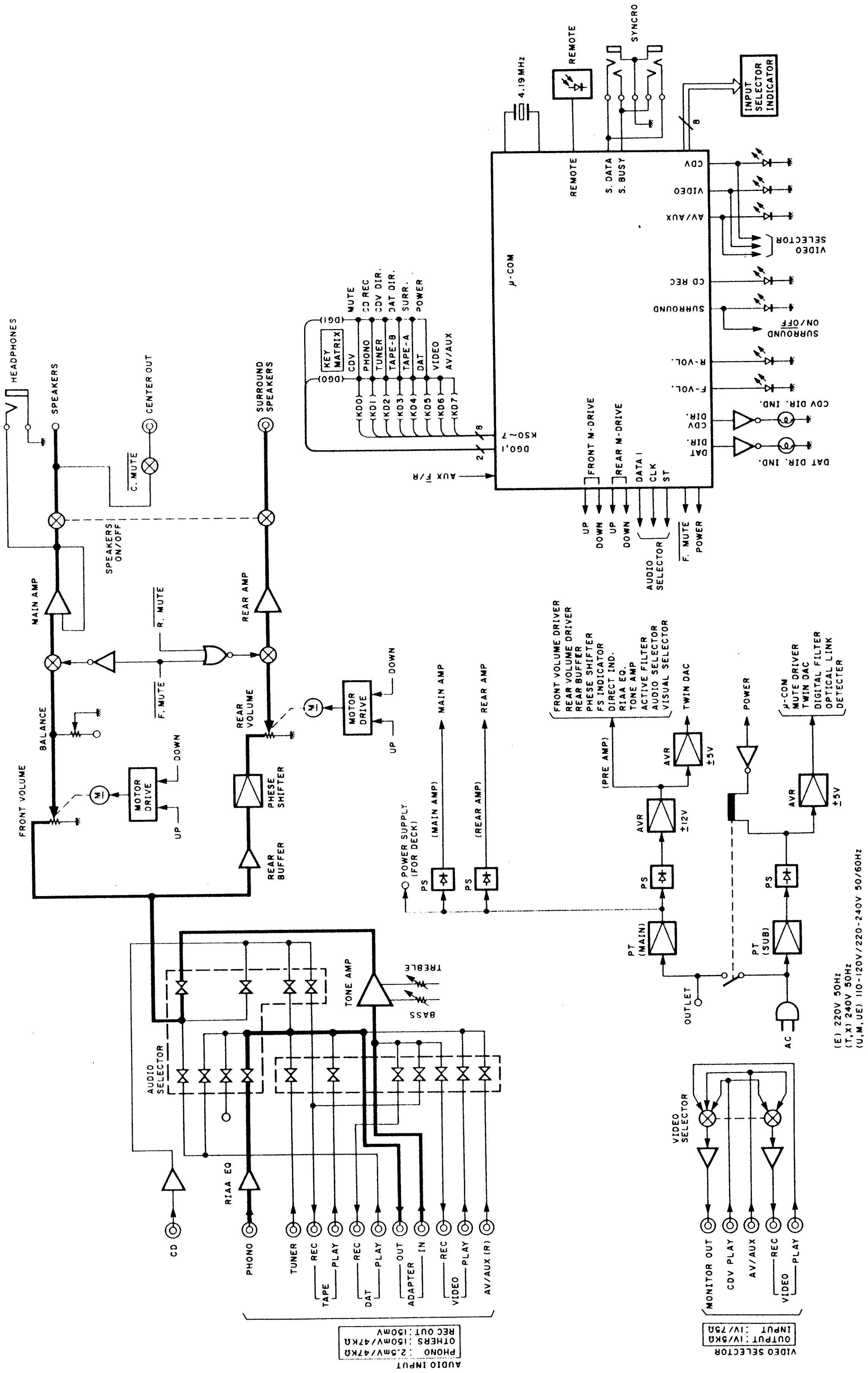
FUNCTION OF AMPLIFIER


Input selector switches
FRONT VOLUME control /indicator
POWER switch
SURROUND switch/ indicator
REAR VOLUME control /indicator
KENWOOD
STEREO INTEGRATED AMPLIFIER A-82
POWER
REAR VOLUME
FRONT VOLUME
SURROUND
AV AUX
VIDEO
DAT
TAPE A
TAPE B
TUNER
PHONO
CD CDV
CD REC
MUTING
PHONES
SPEAKERS
BASS
TREBLE
DAT DIRECT
CD CDV DIRECT
CENTER
BALANCE
PHONES jack
SPEAKERS switch
Remote sensor
MUTING key
CD REC switch/ indicator
BASS/TREBLE controls
BALANCE control
DAT DIRECT switch
CD/CDV DIRECT switch

FUNCTION OF AMPLIFIER


SUPER WOOFER
SPEAKERS IMPEDANCE SELECTOR
SURROUND SPEAKERS
SPEAKERS
SYSTEM CONTROL
AC OUTLET
MONITOR
AC POWER CORD
INPUT
TAPE
DAT
VIDEO
ADAPTOR
AV/AUX
(T) TYPE

BLOCK LEVEL DIAGRAM


HEADPHONES
SPEAKERS
CENTER OUT
C. MUTE
SURROUND SPEAKERS
SPEAKERS ON/OFF
MAIN AMP
REAR AMP
R. MUTE
F. MUTE
BALANCE
REAR VOLUME
FRONT VOLUME
M
MOTOR DRIVE
UP
DOWN
PHESE SHIFTER
REAR BUFFER
TONE AMP
TREBLE
BASS
AUDIO SELECTOR
RIAA EQ
CD
PHONO
TUNER
REC
PLAY
TAPE
REC
PLAY
DAT
OUT
IN
ADAPTER
REC
PLAY
VIDEO
AV/AUX (R)
AUDIO INPUT
PHONO : 2.5mV/47kΩ
OTHERS : 150mV/47kΩ
REC OUT : 150mV
4.19MHz
REMOTE
SYNCRO
INPUT SELECTOR INDICATOR
8
REMOTE
S. DATA
S. BUSY
μ-COM
CDV
VIDEO
AV/AUX
VIDEO SELECTOR
CD REC
SURROUND
SURROUND ON/OFF
R-VOL.
F-VOL.
CDV DIR.
CDV DIR. IND.
DAT DIR.
DAT DIR. IND.
KEY MATRIX
MUTE
CD REC
CDV DIR.
DAT DIR.
SURR.
POWER
CDV
PHONO
TUNER
TAPE-B
TAPE-A
DAT
VIDEO
AV/AUX
DG1
DG0
KD0
KD1
KD2
KD3
KD4
KD5
KD6
KD7
KS0~7
DG0,1
8
2
AUX F/R
FRONT M-DRIVE
REAR M-DRIVE
DATA 1
CLK
ST
UP
DOWN
UP
DOWN
AUDIO SELECTOR
F. MUTE
POWER
MAIN AMP
REAR AMP
FRONT VOLUME DRIVER
REAR VOLUME DRIVER
REAR BUFFER
PHESE SHIFTER
FS INDICATOR
DIRECT IND.
RIAA EQ.
TONE AMP
ACTIVE FILTER
AUDIO SELECTOR
VISUAL SELECTOR
(PRE AMP)
TWIN DAC
AVR
±5V
AVR
±12V
POWER
μ-COM
MUTE DRIVER
TWIN DAC
DIGITAL FILTER
OPTICAL LINK
DETECTER
AVR
±5V
POWER SUPPLY (FOR DECK)
PS
(MAIN AMP)
PS
(REAR AMP)
PS
PS
PT (MAIN)
PT (SUB)
OUTLET
AC
(E) 220V 50Hz
(T,X) 240V 50Hz
(U,M,UE) 110-120V/220-240V 50/60Hz
VIDEO SELECTOR
MONITOR OUT
CDV PLAY
AV/AUX
REC
PLAY
VIDEO
VIDEO SELECTOR
INPUT : 1V/75Ω
OUTPUT : 1V/5kΩ

CIRCUIT DESCRIPTION

Description of Components

POWER SUPPLY UNIT (X00-2520-00)

Component	Use/Function	Operation/Condition/Compatibility
IC1 (μPC7805HF)	AVR	+5V supply (digital circuitry).
Q1	Vide output buffer	For Monitor output.
Q2	Vide output buffer	For VIDEO REC output
Q3	Power relay SW	ON when POWER signal is High.
Q4	Tr SW	For CDV Monitor output.
Q5	Tr SW	For CDV REC output.
Q6	Tr SW	For VTR input and Monitor.
Q7	Tr SW	For BS/AUX input and Monitor.
Q8	Tr SW	For BS/AUX input and REC output.

AUDIO UNIT (X09-2730-00)

Component	Use/Function	Operation/Condition/Compatibility
IC1 (TC9163N) IC2 (TC9164N)	Input Signal Select	Selects each input signal by command from the microcomputer.
IC3 (UPC4570C)	CD Input Buffer	Buffer amp for CD analog input
IC4 (UPC4570C)	Surround Buffer	Buffer amp for rear speakers.
IC5 (UPC4570C)	Surround Buffer	Surround matrix amp for rear speakers.
IC6 (UPC7812HF)	AVR	AVR for +12 V
Q1 ~ 4	Power Transistor	For driving speakers.
Q5, 6	Temperature Compensator	For controlling idling current.
Q7	AVR	Error signal amplifying.
Q8	AVR	Voltage control.
Q9	Surround Control	Controlling the center channel.
Q10	Surround Output Mute	Muting control of center channel.
Q11	Power Control	Power supply control when the power button is turned ON/OFF.

DT1 (X85-1030-11)

Component	Use/Function	Operation/Condition/Compatibility
IC1 (AN6556)	Phono EQ Amp	

DT2 (X89-1010-07)

Component	Use/Function	Operation/Condition/Compatibility
Q1 ~ 4	Input Differential Amp	Q1, 3 (L) and Q2, 4 (R) make up the differential amplifier.
Q5 ~ 8	Secondary Differential Amp	Q5, 7 (L) and Q6, 8 (R) make up the differential amplifier.
Q9, 10	Current Mirror Amp	Consisting of Q9 (L) and Q10 (R).
Q11 ~ 14	Drive Amp	Consisting of Q11, 13 (L) and Q12, 13 (R).
Q18	Power Supply Control	For controlling the power at the rising and falling edges of power supply.
Q19	Power Supply Control	For controlling the primary positive (+) power.

CIRCUIT DESCRIPTION

DT3 (X13-5800-00)

Component	Use/Function	Operation/Condition/Compatibility
IC1 (UPC4570C)	Buffer Amp	

DT4 (X13-6140-00) This Unit is deleted following the change of microprocessor (CX5016-3135 → CXP50163155).

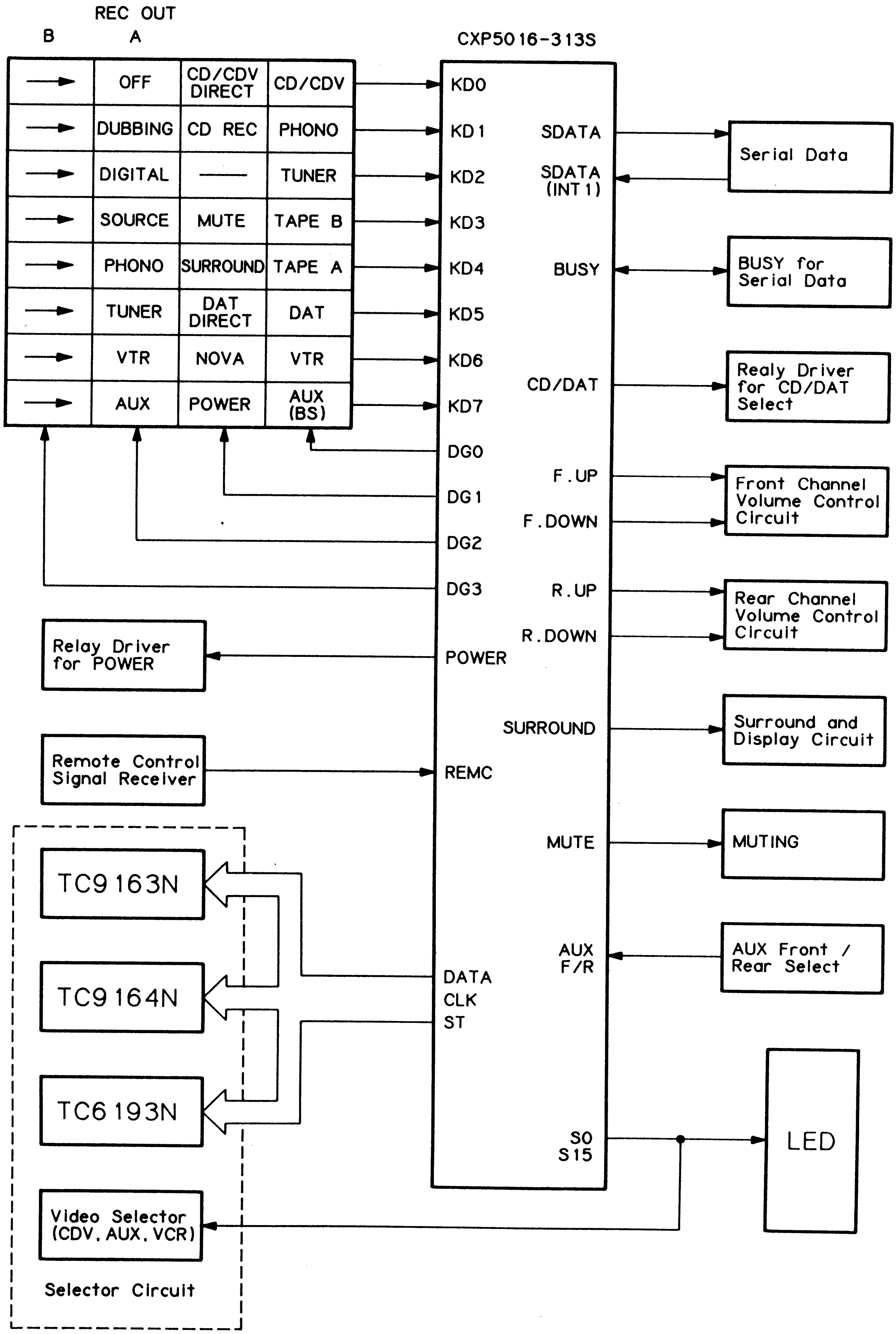
Component	Use/Function	Operation/Condition/Compatibility
IC1 (LC4966)	Switch	DAT REC OUT control.
Q1 ~ 3	IC1 Control	Controls the analog switch by command from the microcomputer.

CONTROL UNIT (X11-2560-00)

Component	Use/Function	Operation/Condition/Compatibility
IC1 (CXP5016-313S)	Microcomputer	Receives the signal from the remote control unit. ON/OFF control of the main transformer. Controls mutual communication with serial data. AV input/output selector control and display. Controls front/rear electronic (motor-driven) volume control and turning ON/OFF of muting function.
IC2 (M51951 A8L)	Microcomputer Reset	Operates when the AC power plug is inserted into the AC outlet to maintain the initial condition. Also operates when the power switch is turned OFF to store the status immediately before turning the power OFF.
IC3, 4 (LB1641)	Front/Rear Electronic (Motor-driven) Volume	Controls the motor revolution direction (clockwise or counterclockwise) with each high level signal transmitted from the microcomputer to adjust the front speaker and rear speaker volume level.
IC5,6 (μPC1238V*1)	Power Amp	Monolithic power amp with loading short-circuit protection circuit.
IC7 (μPC4570C)	Op Amp	Tone control amp for L/R-channels.
Q1 ~ 4	LED Driver	LED lighting driver for FS display.
Q5,6	Lamp Driver	Direct indicator lamp lighting driver.
Q7,8,10,11	Muting	Muting for front and rear channel output levels.
Q9,12	Muting Control	Output muting control.
A1	Remote Control	Receives the infrared signal exclusively from the remote control unit, and transmits it to the microcomputer.

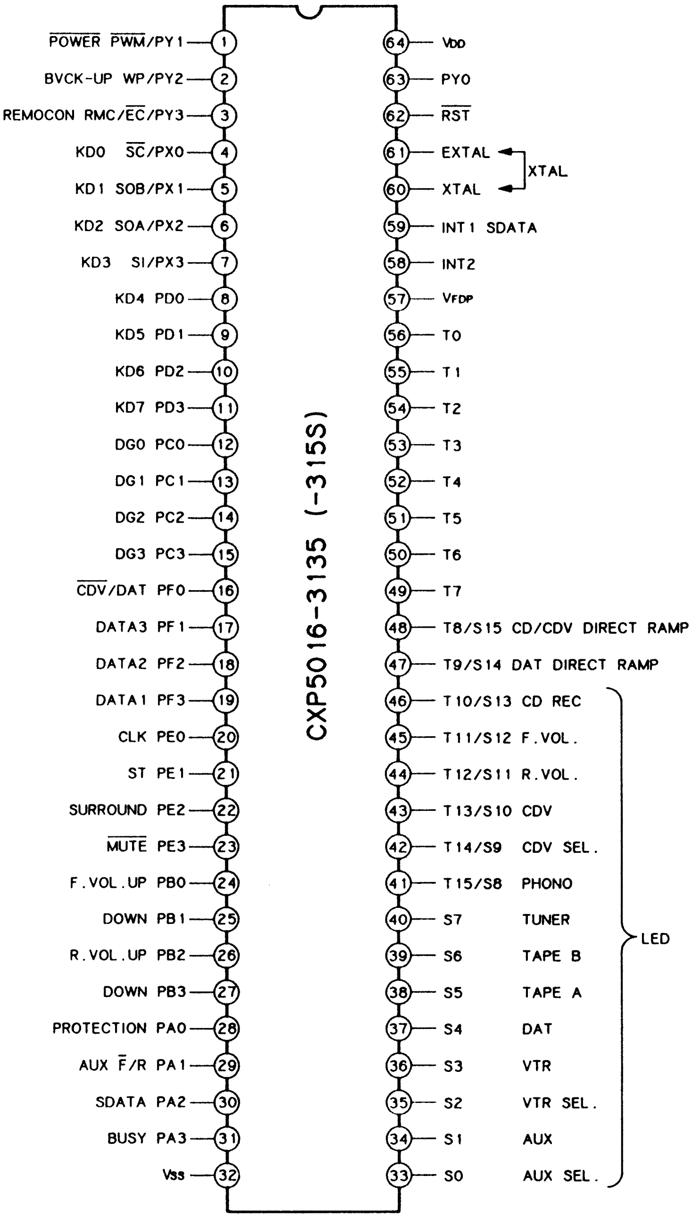
CIRCUIT DESCRIPTION

1-1. Block Diagram of the Microprocessor and Its Surroundings


REC OUT
B
A
CXP5016-313S
OFF
CD/CDV DIRECT
CD/CDV
DUBBING
CD REC
PHONO
DIGITAL
TUNER
SOURCE
MUTE
TAPE B
PHONO
SURROUND
TAPE A
TUNER
DAT DIRECT
DAT
VTR
NOVA
VTR
AUX
POWER
AUX (BS)
KD0
KD1
KD2
KD3
KD4
KD5
KD6
KD7
DG0
DG1
DG2
DG3
POWER
REMC
DATA
CLK
ST
SDATA
SDATA (INT1)
BUSY
CD/DAT
F.UP
F.DOWN
R.UP
R.DOWN
SURROUND
MUTE
AUX F/R
S0
S15
Serial Data
BUSY for Serial Data
Realy Driver for CD/DAT Select
Front Channel Volume Control Circuit
Rear Channel Volume Control Circuit
Surround and Display Circuit
MUTING
AUX Front / Rear Select
LED
Relay Driver for POWER
Remote Control Signal Receiver
TC9163N
TC9164N
TC6193N
Video Selector (CDV, AUX, VCR)
Selector Circuit

CIRCUIT DESCRIPTION

1-2. Pin Assignment


CXP5016-3135 (-315S)
POWER PWM/PY1 1
BVCK-UP WP/PY2 2
REMOCON RMC/EC/PY3 3
KD0 SC/PX0 4
KD1 SOB/PX1 5
KD2 SOA/PX2 6
KD3 SI/PX3 7
KD4 PD0 8
KD5 PD1 9
KD6 PD2 10
KD7 PD3 11
DG0 PC0 12
DG1 PC1 13
DG2 PC2 14
DG3 PC3 15
CDV/DAT PF0 16
DATA3 PF1 17
DATA2 PF2 18
DATA1 PF3 19
CLK PE0 20
ST PE1 21
SURROUND PE2 22
MUTE PE3 23
F.VOL.UP PB0 24
DOWN PB1 25
R.VOL.UP PB2 26
DOWN PB3 27
PROTECTION PA0 28
AUX F/R PA1 29
SDATA PA2 30
BUSY PA3 31
Vss 32
64 VDD
63 PY0
62 RST
61 EXTAL
60 XTAL
XTAL
59 INT1 SDATA
58 INT2
57 VFDP
56 T0
55 T1
54 T2
53 T3
52 T4
51 T5
50 T6
49 T7
48 T8/S15 CD/CDV DIRECT RAMP
47 T9/S14 DAT DIRECT RAMP
46 T10/S13 CD REC
45 T11/S12 F.VOL.
44 T12/S11 R.VOL.
43 T13/S10 CDV
42 T14/S9 CDV SEL.
41 T15/S8 PHONO
40 S7 TUNER
39 S6 TAPE B
38 S5 TAPE A
37 S4 DAT
36 S3 VTR
35 S2 VTR SEL.
34 S1 AUX
33 S0 AUX SEL.
LED

Note : CXP5016-313S will be used in the units manufactured in the period between July and August in 1988, and after then, (SN80900001) it will be replaced with the -315S, which has the same port allocations and compatibility.

CIRCUIT DESCRIPTION

1-3. Explanation of Pins

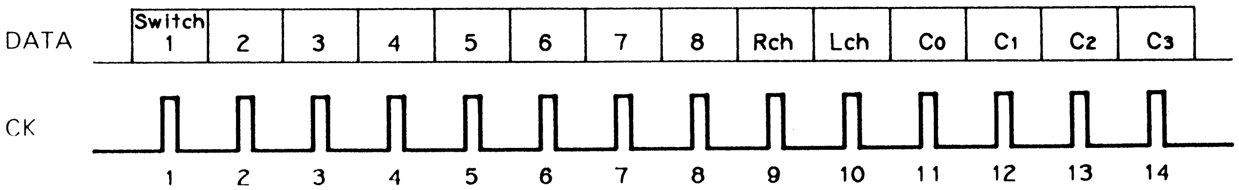
Pin No.	Pin Name	I/O	Name	Function
1	PY1	O	POWER	POWER ON/OFF port. Goes low when power is ON and high when power is OFF.
2	PY2	I	BUCK-UP	Not used (connected to +5 V)
3	RMC	I	REMOCON	Remote control input pin
4 ~ 7	PX0~PX3	I	KD0~KD3	Key scan input port. Active high.
8 ~ 11	PD0~PD3	I	KD4~KD7	Key scan input port. Active high.
12 ~ 15	PC0~PC3	O	DG0~DG3	Key scan output port.
16	PF0	O	CDV/DAT	
17	PF1	O	DATA3	NC
18	PF2	O	DATA2	NC
19	PF3	O	DATA1	For MIDI series: Serial data output port for TC9163N/ TC-9164N.
20	PE0	O	CLK	Serial data clock output port for Selector IC.
21	PE1	O	ST	Serial data S7 output port for Selector IC.
22	PE2	O	SURROUND	Surround ON/OFF and display LED driver port. Goes high when surround is ON, and goes low when it is OFF.
23	PE3	O	MUTE	Muting port. Goes low when muting is ON, and high when it is OFF.
24	PB0	O	F.VOL.UP	Front channl volume UP drive port. When it is high, volume level is increased.
25	PB1	O	F.VOL.DOWN	Front channel volume DOWN drive port. When it is high, volume level is decreased.
26	PB2	O	R.VOL. UP	Rear channel volume UP drive port. When it is high, volume level is increased.
27	PB3	O	R.VOL.DOWN	Rear channel volume DOWN drive port. When it is high, volume level is decreased.
28	PA0	I	PROTECTION	NC
29	PA1	I	AUX F/R	AUX front/rear select input port. Rear AUX is selected when it is high, and front AUX is selected when it is low.
30	PA2	O	SDATA	Serial data output port between system components.
31	PA3	I/O	BUSY	Serial data BUSY I/O port between system components.
32	Vss	O		Ground for microcomputer.
33	S0	O	AUX SEL.	Video selector (AUX) and display LED drive port. Turns ON and LED lights when it is high.
34	S1	O	BC/AUX	Selector AUX (EQ) display LED drive port. LED lights when it is high.
35	S2	O	VTR SEL.	Video selector (AUX) and display LED drive port. Turns ON and LED lights when it is high.
36	S3	O	VTR	Selector VCR display LED drive port. LED lights when it is high.
37	S4	O	NAT	DAT
38	S5	O	TAPE A	TAPE A (1)
39	S6	O	TAPE B	TAPE B (2)
40	S7	O	TUNER	TUNER
41	S8	O	PHONO	PHONO
42	S9	O	CDV SEL.	Video selector (CDV) and display LED drive port. Turns ON and LED lights when it is high.
43	S10	O	CDV	Selector CDV display LED drive port. LED lights when it is high.
44	S11	O	R. VOL	Rear channel volume
45	S12	O	F. VOL	Front channel volume
46	S13	O	CD REC	CD REC
47	S14	O	DAT DIRECT RAMP	DAT Direct indicator lamp
48	S15	O	CDV DIRECT RAMP	CDV Direct indicator lamp
49~56	T7~T0			Not used (OPEN)
57	VFDP	I		Loading power supply pin
58	INT2			Not used (GND)
59	INT1	I	SDATA	Serial data input port between system components.
60	XTAL	O		Clock generator output port.
61	EXTAL	I		Clock generator input port.
62	RST			Reset signal input, and built-in power ON reset circuit output pin.
63	PYO			Not used (Pull-up)
64	VDD			Positive power supply pin of the microcomputer.

CIRCUIT DESCRIPTION

2. Selector IC Operation

Data input

TC9162/63/64N can control each analog switch arbitrarily by inputting the specified data to the DATA, CK and ST pins. The data consists of 14 bits which are allocated as follows:



Since the 1st ~ 8th bits are corresponding to the analog switches 1 ~ 8, set the bit level to '1' corresponding to the switch to be turned ON. (Note)

The 9th and 10th bits are the left and right channel select bits.
When this bit level is set to '1', the corresponding channel is selected. Therefore, both L/R simultaneous status ('1', '1') or L/R independent status ('1', '0' or '0', '1') can also be set.

The 11th bit to 14th bit are the code bits to be used for chip select.
For example, when TC9162N, TC9163N and TC9164N are used simultaneously, DATA, CK and ST pins are connected commonly and any of TC9162N, TC9163N and TC9164N can be selected by these code bit data.

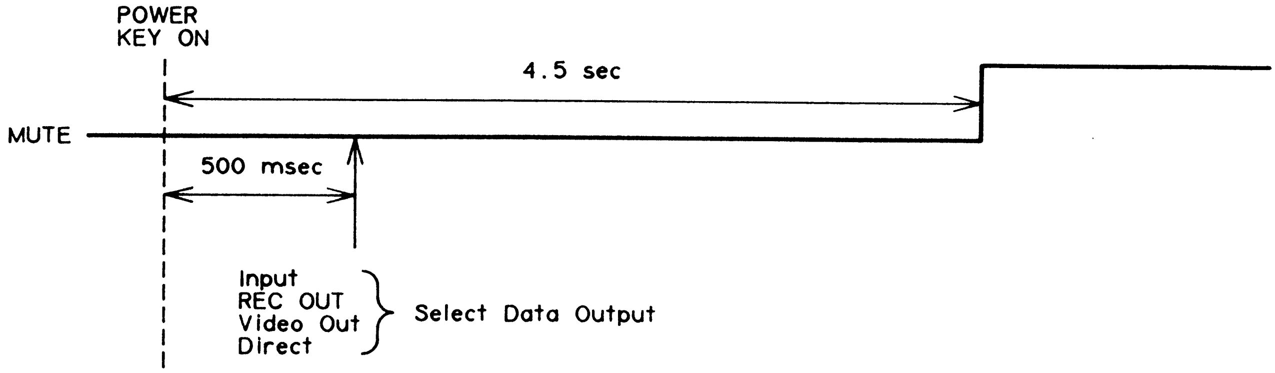
Chip select codes are set as follows:

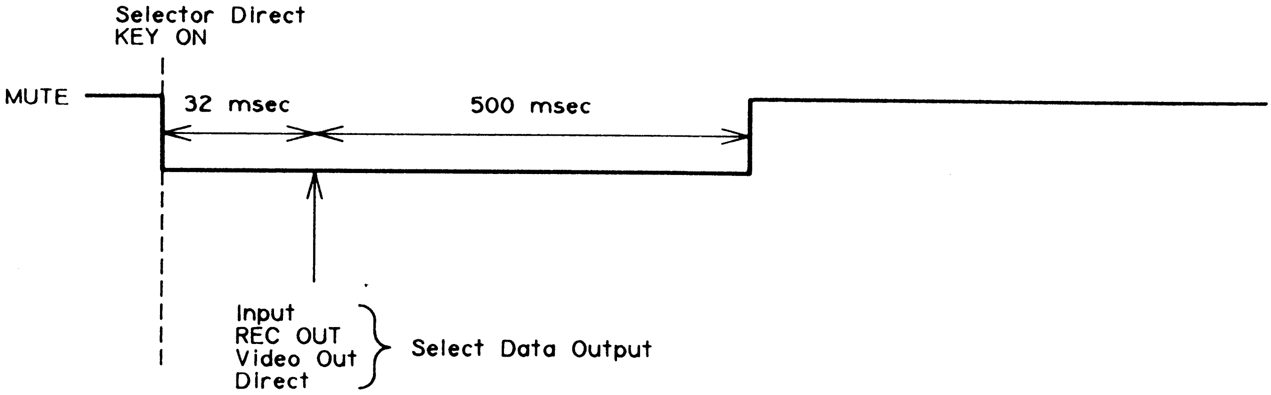
	C_0	C_1	C_2	C_3
TC9162N	0	0	0	0
TC9163N	1	0	0	0
TC9164N	0	1	0	0

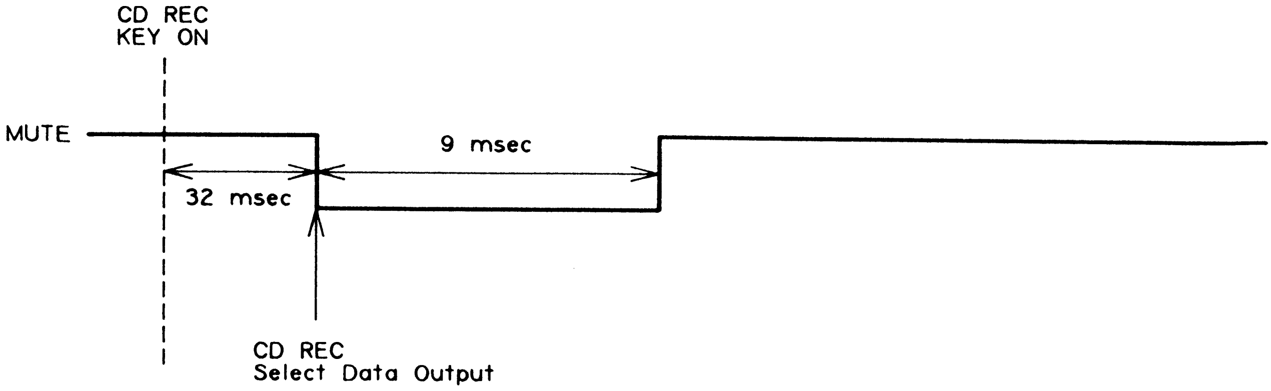
Note : Since TC9162N has the switches of 7 lines, the 8th bit should be set to '0'.

3. Timing Chart

Muting timing

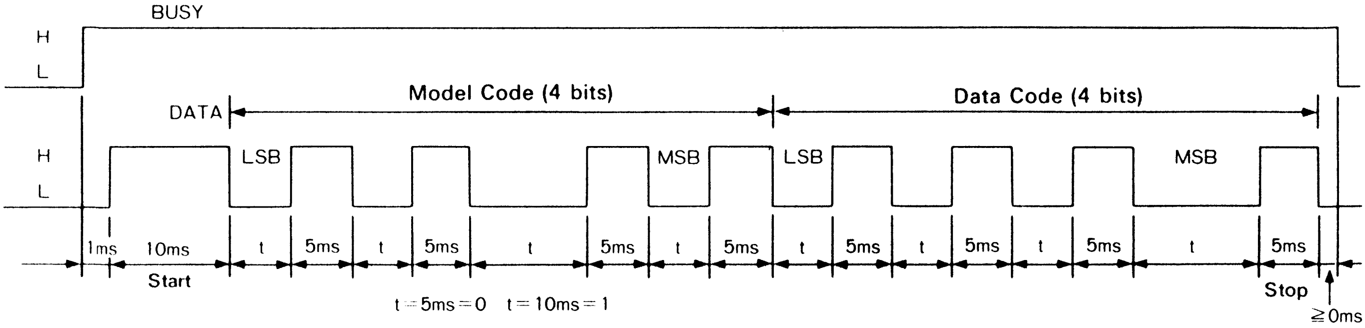

POWER
KEY ON
4.5 sec
MUTE
500 msec
Input
REC OUT
Video Out
Direct
Select Data Output


Selector Direct
KEY ON
MUTE
32 msec
500 msec
Input
REC OUT
Video Out
Direct
Select Data Output


CD REC
KEY ON
MUTE
9 msec
32 msec
CD REC
Select Data Output

CIRCUIT DESCRIPTION

4-1. Explanation of Serial Data Communication

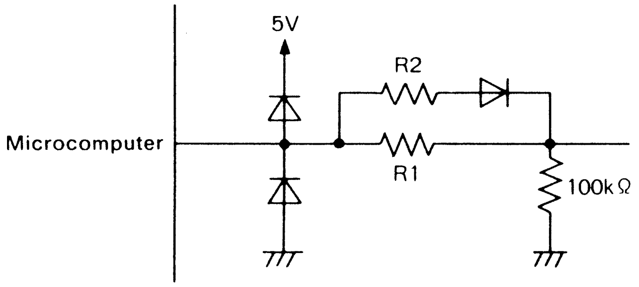


The serial data communication format is defined as shown above, in which the BUSY/DATA 2-wire full-duplex bus is used. 1 word consists of 8 bits, and the most significant 4 bits are defined as the model code of the transmitter (4 = CD player in the above example) while the subsequent 4 bits are defined as the data code (8 = PLAY in the above example). <48H> The high level signal of 10 ms at the beginning of the DATA shows the start of the serial data. Data is determined by the length of L period. It is '0' when L is 5 ms, and '1' when 10 ms. The high level signal of 5 ms shows the separator of the data. The BUSY signal is inverted to high 1 ms faster than the start of DATA and goes low at the same time or later of the end (stop) of the DATA. The BUSY signal is used so that the DATA output signals do not interfere with each other between components, and should be low level when the serial data is output. If the BUSY signal is high, the data is output until the BUSY signal goes low.

4-2. System Connections with serial signals

Interface circuit

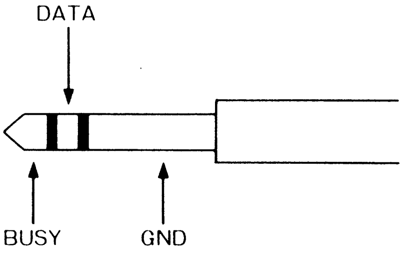
Both DATA and BUSY signals are connected as follows:



* Constants for R_1, R_2 differ for each microcomputer used.
- In case of μPD7537, μPD7538............ R_1 : 4.7 kΩ, R_2 : 330 Ω
- In other cases....................... R_1 : 100 kΩ, R_2 : 680 Ω

Connection

DATA and BUSY lines should be connected using stereo mini jacks.

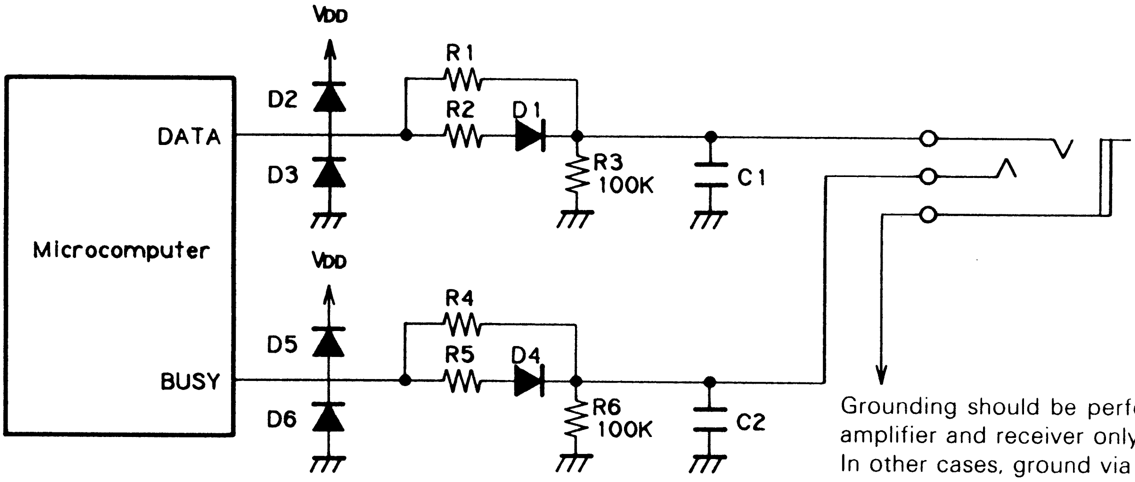


* GND should be applied to the amplifier.

Number of stereo mini jacks

Amplifier, Cassette Deck, Tuner, Remote Control............	2
CD player, Turntable..	1

CIRCUIT DESCRIPTION



Grounding should be performed for amplifier and receiver only.
In other cases, ground via capacitor or diode, or set open.

① R1, R4 :
R1, R4 are determined by the input leakage signal of the microcomputer used.
- When leakage current is less than 10 μA/5 V:
  R1, R4 = 100 kΩ
  (In the normal CMOS input port, it is almost 3 μA/5 V.)
- When the leakage current exceeds the above value:
  R1, R4 = 4.7 kΩ
  (Example : μPD77538AC/37AC, etc.)

② R2, R5 : For protection when output is shorted.
- The minimum value with which the current becomes the maximum rated value or less even when the output is short-circuited. But less the 680 Ω. Normally about 330 Ω.

③ R3, R6 : Input pull-down resistance.
- 100 kohms regardless of the microcomputer. Be sure to insert the line between R1, D2 and the jacks.

④ D1, D4 : Reverse current prevention (To prevent the impedance from lowering when power is turned OFF.)

⑤ D7, D3, D5, D6 : For port protection. Be sure to insert this position (between R1, R4 and the port).

⑥ C1, C2 : For dealing with static electricity.
- It is attached only when required. Less than 1000 pF.

⑦ The GND terminal of the jacks should be grounded for the amplifier and the receiver only. For other components, it should be open, or grounded via capacitor or diodes.

⑧ When the input and output are separated such as using the N-channel open drain port, etc., it should be connected so as to be equivalent to the above circuit.

⑨ Since an impedance between R1, R4 and the microcomputer ports is high in the condition all components are connected, the connection line should be as short as possible.

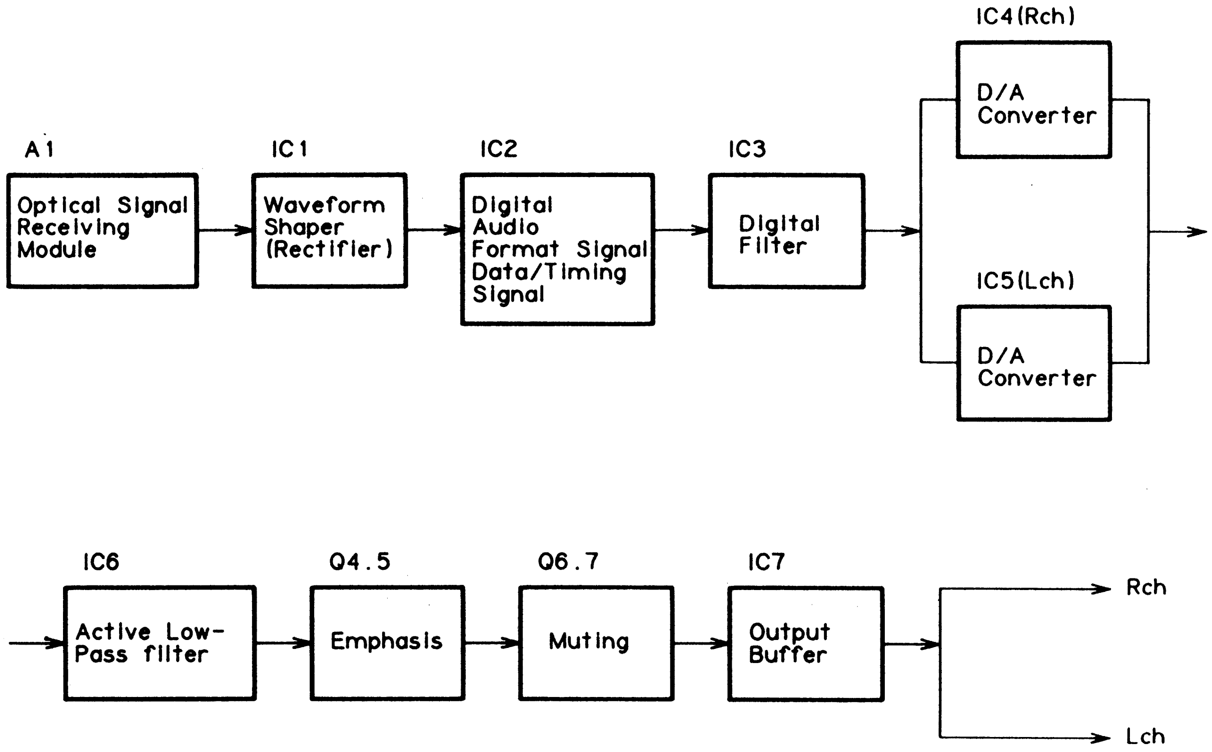
CIRCUIT DESCRIPTION

Type Code (4-bit) / FUNCTION Code (4-bit)		AMPI	TUNER	PLAYER	CD	DECK A	DECK B	AMP II	REMOTE CONTROL							
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	—	—	—	—	—	—	—	—	0	PHONO	DAT	FRONT BAL L	□ (PLAYER)	◁ (DECK A)	AV AMP M.READ 1	REC SEL TAPE1
1	—	POWER ON	POWER ON	POWER ON	POWER ON	POWER ON	AUTO BIAS START	—	1	TUNER	TV	FRONT BAL R	< or ◁/○ (PLAYER)	▷ (DECK A)	AV AMP M.READ 2	REC SEL TAPE 2
2	—	SEL.TUNER	Deck Timer P/R Cancel	—	—	TUNER REC	TUNER REC	POS. TUNER	2	CD (CD/AUX)	VIDEO 2	REAR BAL L	◁◁ (PLAYER)	◁◁ (DECK A)	AV AMP M.READ 3	REC SEL VIDEO 1
3	—	SEL. PHONO	—	—	—	PHONO REC	PHONO REC	POS. PHONO	3	AUX (VIDEO 2)	(DIG1) DAT DIG.	REAR BAL R	▷▷ (PLAYER)	▷▷ (DECK A)	AV AMP M.READ 4	REC SEL VIDEO 2
4	—	SEL.CD	—	—	CLOSE	CD REC	CD REC	POS. CD	4	TAPE 1 (TAPE A)	(DIG 2) CD DIG.	VIDEO A (VDP1)	MODE (CD)	▯▯ (DECK A)	—	—
5	—	SEL. TAPE A	SYSTEM ON	COUNT	MEMORY READ	TAPE A REC	TAPE A REC	POS. TAPE A	5	TAPE 2 (TAPE B)	—	VIDEO B (VDP2)	GE	□ (DECK A)	—	—
6	—	SEL. TAPE B	SYSTEM OFF	MEMO	MEMO	TAPE B REC	TAPE B REC	POS.TAPE B	6	VIDEO (VIDEO 1)	—	VDP 3 (BS)	REAR VOL. DOWN	○ REC (DECK A)	—	—
7	—	SEL. AUX (SEL. VIDEO 3)	REMOCON KEY OFF	—	—	AUX REC	AUX REC	POS AUX	7	ROULETTE PLAY	—	AUDIO	REAR VOL. UP	SURROUND ON/OFF	—	—
8	—	ROULETTE ON	PLAY	PLAY	PLAY	PLAY	PLAY	—	8	CH. DOWN	DISC (CD CONTROL)	REAR BAL L	CHECK (CD)	◁ (DECK B)	SHARPNESS DOWN	—
9	—	ROULETTE OFF	—	STOP	STOP	STOP	STOP	—	9	CH. UP (PRESET SCAN)	—	REAR BAL R	□ (CD)	▷ (DECK B)	SHARPNESS UP	—
A	—	SEL. VIDEO (VIDEO1) (VTR)	SEL. ANALOG	MUTE ON	PAUSE	VIDEO REC	VIDEO REC	POS. VIDEO	VIDEO 3	VOL. DOWN	—	REAR VOL. DOWN	CLEAR (CD)	◁◁ (DECK B)	DETAIL DOWN	—
B	—	—	SEL. DIGITAL	MUTE OFF	SAMPLE START	—	Computer CD REC Start	PHONO REC SW ON	MUSIC SELECT MODE ON/OFF	VOL. UP	—	REAR VOL. UP	▷ (CD)	▷▷ (DECK B)	DETAIL UP	—
C	—	—	DUB	DUB 2	DUB	—	DUB	PHONO REC SW OFF	MUSIC SELECT	MUTE	—	AV AMP MEMORY	REPEAT (CD)	▯▯ (DECK B)	DELAY TIME DOWN	—
D	—	—	SEL. CD DIG.	DUB 1	Tray OPEN	TAPE 2 REC	TAPE 2 REC	TAPE 1 ON	LW (J= TV)	POWER	+10 (CD)	AV AMP MEMU	EDIT (CD)	□ (DECK B)	DELAY TIME UP	—
E	—	—	SEL. DAT DIG.	RANDOM REC	Computer CD REC Standby	—	Computer CD REC Standby	TAPE 2 OFF	MW (AM)	DIRECT	TIME DISPLAY (CD)	TAPE MONITOR	|◁◁ (CD)	○ REC (DECK B)	ENHANCER ON/OFF	—
F	—	DP75 Connection Cord (SEL. DAT)	SEL. CDV.DIG.	—	S-CCRS START	POWER OFF (DAT REC)	DAY REC	POS. DAT	FM	PRESET FUNC. A/B	GE ON/OFF	AUDIO INJECTION	▷▷| (CD)	SURROUND MODE	DELAY ON/OFF	—

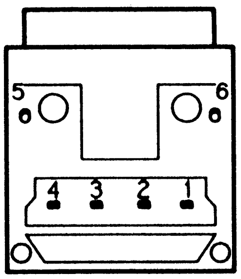
CIRCUIT DESCRIPTION

5-1. Signal Processing Unit (X32-1330-00)

Block Diagram


IC4(Rch)
A1
IC1
IC2
IC3
Optical Signal Receiving Module
Waveform Shaper (Rectifier)
Digital Audio Format Signal Data/Timing Signal
Digital Filter
D/A Converter
IC5(Lch)
D/A Converter
IC6
Q4.5
Q6.7
IC7
Active Low-Pass filter
Emphasis
Muting
Output Buffer
Rch
Lch

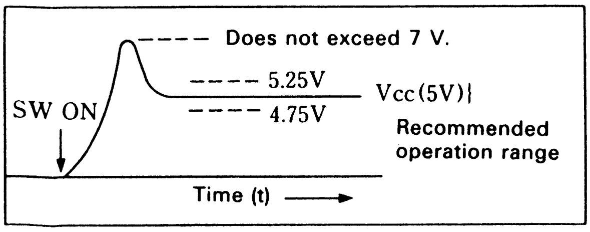
5-2. Optical Signal Receiving Module (W02-0937-05, TORX-174)



(Bottom View)

Pin No.	Connection
1	Output
2	GND
3	Vcc
4	GND
5	Case
6	Case

- **Power supply condition**



CIRCUIT DESCRIPTION

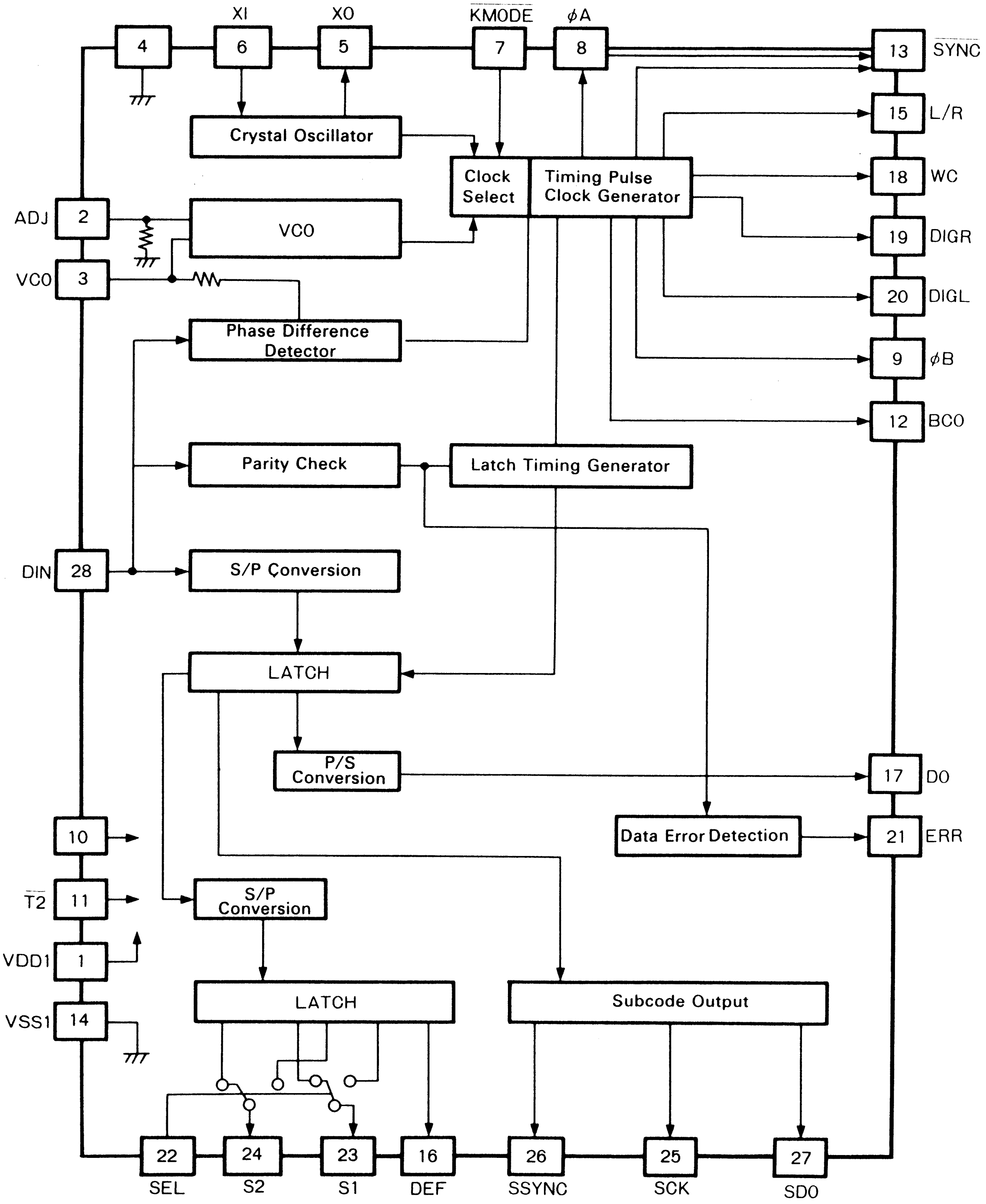
- **Electrical/optional characterestics (TORX174)**

Type	Item	Symbol	Condition	Min. Value	Standard	Max. Value	Unit
TORX174	Maximum receiving photopower	P_{MAX}	6 Mb/s	-14.5	-	-	dBm
	Mıximum receiving photopower	P_{MIN}	6 Mb/s	-	-	-24	dBm
	Rising time	tr	C_L=10pF	-	10	30	ns
	Faling time	tf	C_L=10pF	-	5	30	ns
	Power consumption	Icc		-	22	40	mA
	High level output voltage	V_{OH}	V_{CC}=4.75V, I_{OH}=-0.15mA	2.7	-	-	V
	Low level output voltage	V_{OL}	V_{CC}=4.75V, I_{OL}=1.6mA	-	-	0.4	V

CIRCUIT DESCRIPTION

5-3. IC2 (YM3623B) X32-1330-00

Block Diagram


XI
XO
KMODE
ϕA
4
6
5
7
8
13
SYNC
Crystal Oscillator
15
L/R
Clock Select
Timing Pulse Clock Generator
18
WC
ADJ
2
VCO
19
DIGR
VCO
3
20
DIGL
Phase Difference Detector
9
ϕB
12
BCO
Parity Check
Latch Timing Generator
DIN
28
S/P Conversion
LATCH
P/S Conversion
17
DO
10
Data Error Detection
21
ERR
T2
11
S/P Conversion
VDD1
1
LATCH
Subcode Output
VSS1
14
22
SEL
24
S2
23
S1
16
DEF
26
SSYNC
25
SCK
27
SDO

CIRCUIT DESCRIPTION

IC2 (YM3623B)

● Pin Functions

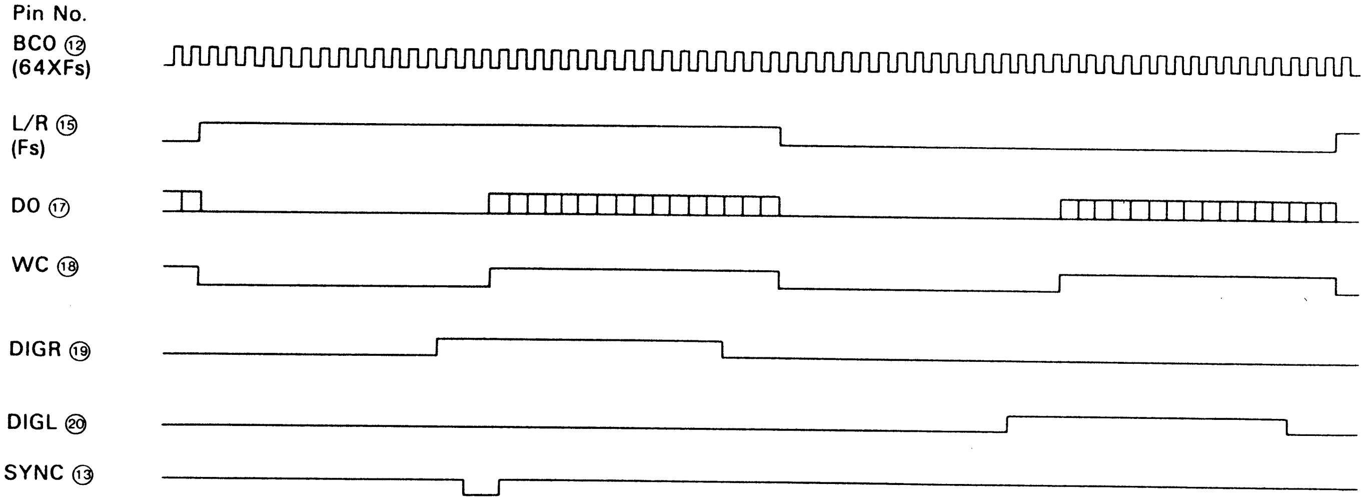
Pins with (PU) are pulled-up internally.

Pin No.	Pin Name	I/O	Name	Function
1	VDD1		VDD	System circuits power supply (+5 V).
2	ADJ	I	ADJ	VCO oscillator frequency adjustment pin. Non connection.
3	VCO	I/O	VCO	Externally connected capacitor pin for VCO circuit.
4	VSS2		Vss	GND pin for VCO circuit. Connect commonly with VSS1. They are commonly connected inside the LSI.
5	XO	O	XO	Crystal oscillator pin (16.9344 MHz).
6	XI	I	XI	Crystal oscillator pin.
7	$\overline{\text{KMODE}}$	I(PU)	KMODE	High : Activates the PLL circuit when the signal is input to DIN pin, and activates the crystal oscillator when no signal is input. Low: Uses the crystal oscillator regardless of the DIN pin.
8	ϕA	O	16.9M	16.9344 MHz when crystal oscillator is used. It varies depending on the data rate of the signal input to the DIN pin when the PLL circuit is activated. (About 16.9344 MHz when fs = 44.1 kHz.)
9	ϕB	O		Divided into 1/3 of øA when crystal oscillator is used. It varies depending on the data rate of the signal input to the DIN pin when the PLL circuit is activated. (About 5.6448 MHz when fs = 44.1 kHz)
10	$\overline{\text{T1}}$	I(PU)		Internal circuit check pin.
11	$\overline{\text{T2}}$	I(PU)		Internal circuit check pin.
12	BCO	O	BCLK	Timing clock of the signal output from DO pin.
13	$\overline{\text{SYNC}}$	O		Sync signal.
14	VSS1	O	Vss	GND for system circuit (+0 V).
15	L/R	O	LRCK	Indicates that the L or R channel data is output from DO pin. High = L channel, low = R channel.
16	DEF	O	EMPH	High = shows that emphasis is applied to the input data. Low = shows that emphasis is not applied to the input data.
17	DO	O	DATA	16-bit data output.
18	WC	O	WDCK	Shows that the data is output to Do pin.
19	DIGR	O		R-channel deglitch signal
20	DIGL	O		L-channel deglitch signal
21	ERR	O	ERR	High = parity error, or operates in crystal. Low = no error
22	SEL	I(PU)		Refer to separate section.
23	S1	O		Refer to separate section.
24	S2	O		Refer to separate section.
25	SCK	O		Subcode output clock.
26	SSYNC	O		Subcode signal.
27	SDO	O		Subcode data output pin.
28	DIN	I(PU)	DIN	Data input pin.

CIRCUIT DESCRIPTION

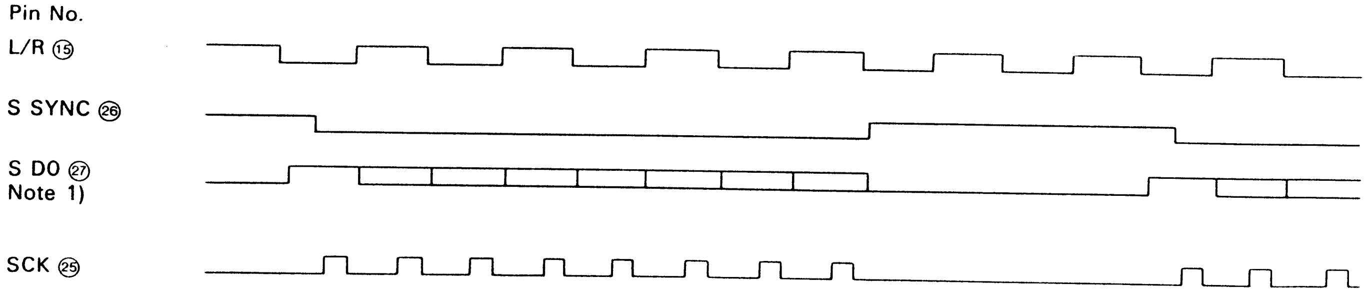
Timing Chart

Output timing ①


Pin No.
BCO ⑫
(64XFs)
L/R ⑮
(Fs)
DO ⑰
WC ⑱
DIGR ⑲
DIGL ⑳
SYNC ⑬

Note 1 : Fs shows the sampling frequency. For example, it is 44.1 kHz for the Compact Disc.

Output timing ②

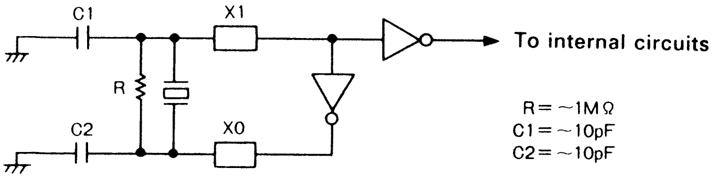

Pin No.
L/R ⑮
S SYNC ㉖
S DO ㉗
Note 1)
SCK ㉕

Note 1 : When the U bit input to DIN pin is '1', U bit will output to SDO (pin (27)) as it is for eight times.
Note 2 : The above timing shows a typical example. Depending on the data timing of the U bit input to DIN pin, SDO (pin (27)) data starts from L channel or R channel, and the period of one cycle for outputting 8 bits is varied.

CIRCUIT DESCRIPTION

Clock and Related Items

When a crystal oscillator (16.9344 MHz) is connected between pins X1 and X0, oscillation begins.

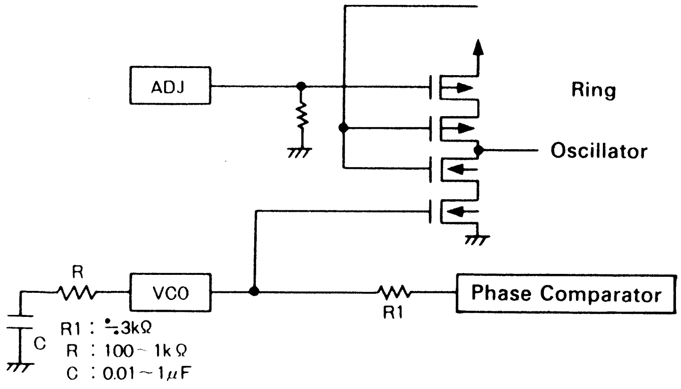


The crystal clock is operated when the $\overline{\text{KMODE}}$ pin is low or when the $\overline{\text{KMODE}}$ pin is high and not data is input to DIN pin. At this time, all the data output to outside will be ignored. In the reverse condition as above, crystal oscillator is operated by the clock frequency which is picked up from the data input to the DIN pin with the internal PLL circuit.

Note : Since the $\overline{\text{KMODE}}$ pin is also used for the internal resetting, it should be inverted to low once at least once when the power is initially turned ON or before the PLL is locked to the input signal from the DIN pin. When inverting the $\overline{\text{KMODE}}$ pin to high, wait until the period exceeding the RC time constant for the VCO pin has been elapsed, and then set the $\overline{\text{KMODE}}$ pin to high.

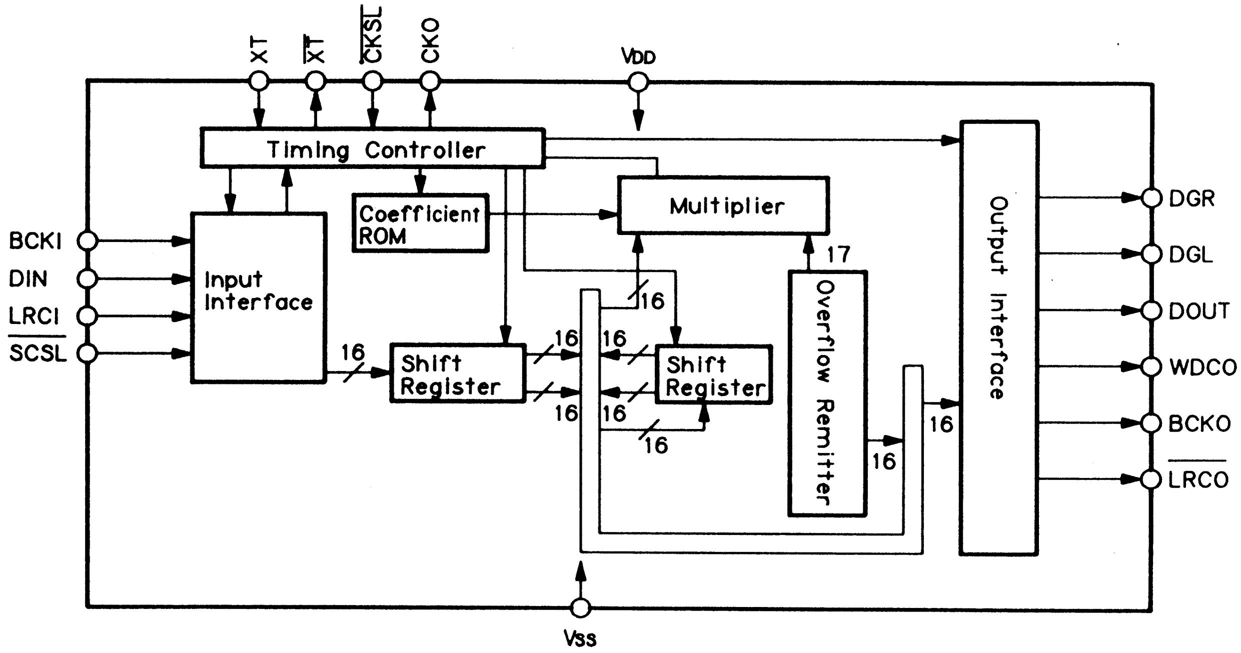
VCO and Related Items

To reproduce the clock frequency from the signal input to DIN pin, the PLL circuit is internally provided. The VCO pin is used for adjustment of the lead-in time constant. When the T1, T2 pins are set to low, KMODE pin to high and no data is input to DIN pin, the VCO starts oscillating with the self-running (free-running) frequency. No signal should be connected to ADJ pin. (No adjustment is required.)



CIRCUIT DESCRIPTION

5-4. IC3 (SM5807EP) Digital Filter


XT
$\overline{\text{XT}}$
$\overline{\text{CKSL}}$
CKO
VDD
Timing Controller
Coefficient ROM
Multiplier
Input Interface
Shift Register
Shift Register
Overflow Remitter
Output Interface
BCKI
DIN
LRCI
$\overline{\text{SCSL}}$
DGR
DGL
DOUT
WDCO
BCKO
$\overline{\text{LRCO}}$
16
17
Vss

Explanations of Pin

Pin No.	Pin Name	I/O	Pin Function
1	XT	I	Oscillator input pin.
2	$\overline{\text{XT}}$	o	Oscillator output pin when $\overline{\text{CKSL}}$ = high. (Open) when $\overline{\text{CKSL}}$ = low
3	$\overline{\text{CKSL}}$	Ip	$\overline{\text{CKSL}}$ = high : 16.9344 MHz to XT.or 17.2872 MHz crystal oscillator or ecternal input. $\overline{\text{CKSL}}$ = low : 8.4672 MHz to XT or 8.6436 MHz external input.
4	CKO	o	Clock output (Buffer output of XT input clock)
5	LRCI	Ip	44.1 kHz sync clock input
6	DIN	Ip	Serial data input
7	BCKI	Ip	Serial input bit clock input
8	Vss		GND pin (0V)
9	$\overline{\text{SCSL}}$	Ip	$\overline{\text{SCSL}}$ = high : System clock = 192 fs $\overline{\text{SCSL}}$ = low : System colck = 196 fs (fs : sampling frequency)
10	DGR	o	R-channel deglitch signal (176.4 kHz)
11	DGL	o	L-channel deglitch signal (176.4 kHz)
12	DOUT	o	Serial data output
13	WDCO	o	Output control clock (352.8 kHz)
14	$\overline{\text{LRCO}}$	o	Output control clock (176.4 kHz)
15	BCKO	o	Serilal output bit clock (8.4672 MHz or 8.6436 MHz)
16	VDD		Power supply pin (5 V)

Note : I : Input pin (Ip shows that pull-up resistance is incorporated).
O : Output pin

CIRCUIT DESCRIPTION

■ Basic Concept of SM5807

● Basic structure of the filter

The SM5807 consists of a couple of linear phase FIR filters which each functioning as double oversampling operations are stacked serially, and its basic structure is as shown in Fig. 1. The input signal sampled with 44.1 kHz is converted into the signal sampled with 88.2 kHz by the primary 61st-order digital filter which operates a doubled oversampling frequency. Then the 13th-order secondary digital filter oversamples the input signal which is sampled by 88.2 kHz frequency with further doubled frequency. Thus, the originally input signal is quadruple oversampled and output in 176.4 kHz sampling rate. Fig. 2 simulates the filtering characteristics of each filter as well as the total characteristics by the combination of them. The 1st (primary) digital filter attenuates the frequencies over 24.1 kHz by 50 dB or 45 dB with the double-oversampling operation, as shown in (A). However, the sampling noise still remains in the range E24.1 kHz around 88.2 kHz frequency. When the 2nd (secondary) digital filter oversamples the output of the 1st digital filter in double oversampling operation, the sampling noise around 176.4 kHz remains but, the frequency range between 64.1 kHz and 112.3 kHz can be widely attenuated by setting the frequencies over 64.1 kHz as the rejection range, as shown in (B). In here, when the attenuation for the rejection range of the 2nd digital filter is set to 50 dB or 45 dB, the total characteristics by the stacked connection becomes as shown in (C), and thus the construction of the subsequent low-pass filter can be simply made. The actual filtering characteristics of the SM5807 which is designed in the above basic concept is shown in the section "filtering characteristics" on page 26.

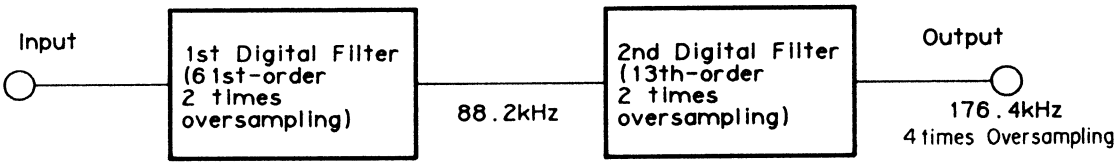


Fig.1

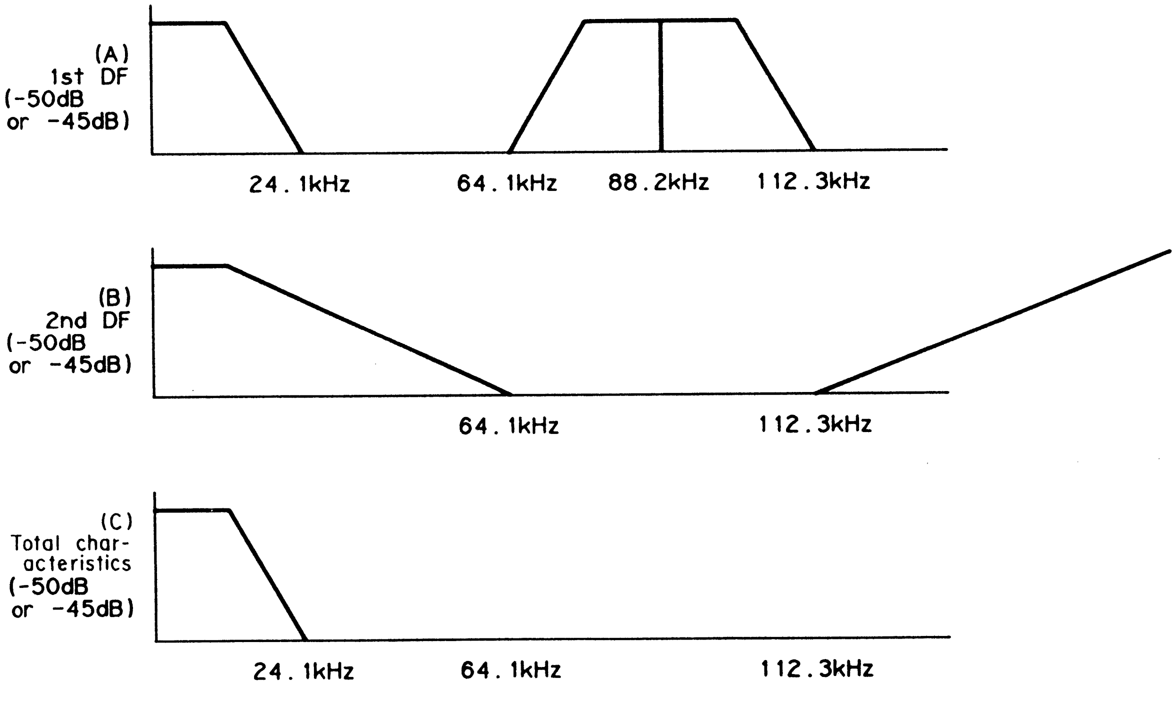


fig.2

CIRCUIT DESCRIPTION

■ Functions

(1) System clock

The system clock of this LSI is 192 fs = 8.4672 MHz or 196 fs = 8.6436 MHz. Either frequency can be selected by the SCSL pin. (fs = 44.1 kHz)

$\overline{SCSL}$ = high (or OPEN) .... 192 fs (corresponds to 96 fs)
$\overline{SCSL}$ = low .... 196 fs (corresponds to 98 fs)

● Clock generation method:

$\overline{SCSL}$	High (or open)		L	
$\overline{CKSL}$	High (or open)	L	High (or open)	L
Clock generating method	Crystal oscillator (X'tal)/ External input (EXT)	←	Crystal oscillator (X'tal)/ External input (EXT)	←
XT/$\overline{XT}$ input frequency	384fs=16.9344MHz	192fs=8.4672MHz	392fs=17.2872MHz	196fs=8.6436MHz
Clock output (CK$\overline{O}$)	↑	↑	↑	↑
System clock (internal)	192fs=8.4672MHz	↑	196fs=8.6436MHz	↑

(2) Serial input (Data and bit clock)

The serial input data is input at the rising edge of serial input bit clock BCKI. Therefore, the data is varied at the falling edge of BCKI. After 16-bit signal is input, the serial data is latched by the internal register by the sync clock LRCI.

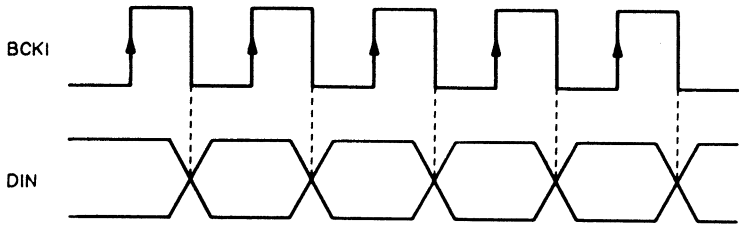


Fig. 3

(3) Input data

The data is input from MSB (most significant bit) first in 2's complement method.

(4) Operation start

Operation starts from the rising edge of the sync clock LRCI.

(5) Serial output (Data and bit clock)

Since the L-channel/R-channel serial data is output from DOUT alternately, the output data can be converted with a single DAC (D/A converter). At this time, when the externally connected circuits (two gates) are used, the in-phase conversion is made possible with two DAC units. The serial output bit clock is output from the BCKO pin. Since the data varies in synchronous with the falling edge of this bit clock, it can be input to the DAC at the rising edge.

BCKO = 8.4672 MHz .... (When $\overline{SCSL}$ is high or open: system clock = 192 fs)
BCKO = 8.6436 MHz .... (When $\overline{SCSL}$ is low: system clock = 196 fs)

(6) Output data

The 2's complement data is output from the MSb first.

(7) Deglitch signal

DGL .... L-ch deglitch signal : 176.4 kHz (25% duty)
DGR .... R-ch deglitch signal : 176.4 kHz (25% duty)

CIRCUIT DESCRIPTION

■ Timing Chart

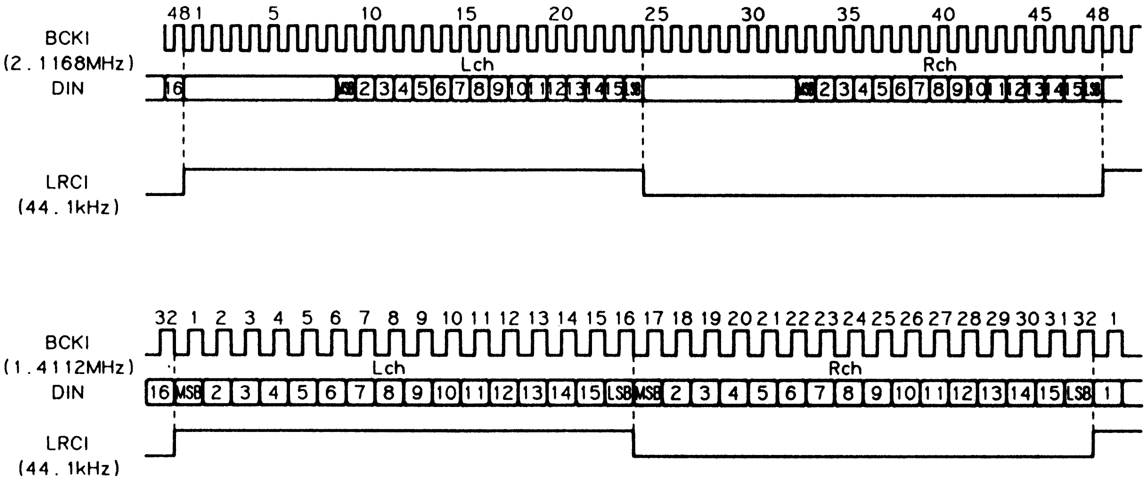

48 1 5 10 15 20 25 30 35 40 45 48
BCKI
(2.1168MHz)
DIN
Lch
Rch
16
MSB 2 3 4 5 6 7 8 9 10 11 12 13 14 15 LSB
LRCI
(44.1kHz)
32 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 1
BCKI
(1.4112MHz)
DIN
Lch
Rch
16 MSB 2 3 4 5 6 7 8 9 10 11 12 13 14 15 LSB MSB 2 3 4 5 6 7 8 9 10 11 12 13 14 15 LSB 1
LRCI
(44.1kHz)

Fig.4 Serial input timing (when $\overline{SCSL}$ is high or open)

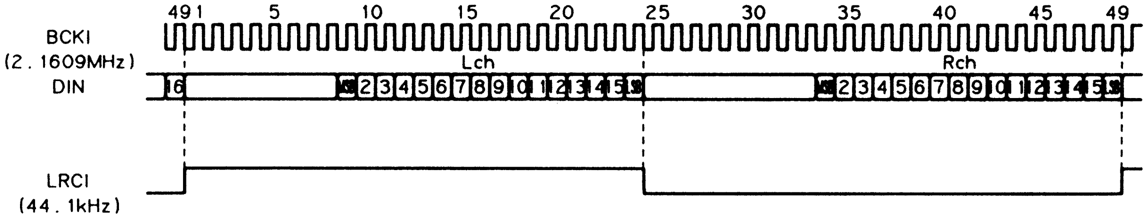

49 1 5 10 15 20 25 30 35 40 45 49
BCKI
(2.1609MHz)
DIN
Lch
Rch
16
MSB 2 3 4 5 6 7 8 9 10 11 12 13 14 15 LSB
LRCI
(44.1kHz)

Fig. 5 Serial input timing (when $\overline{SCSL}$ is low)

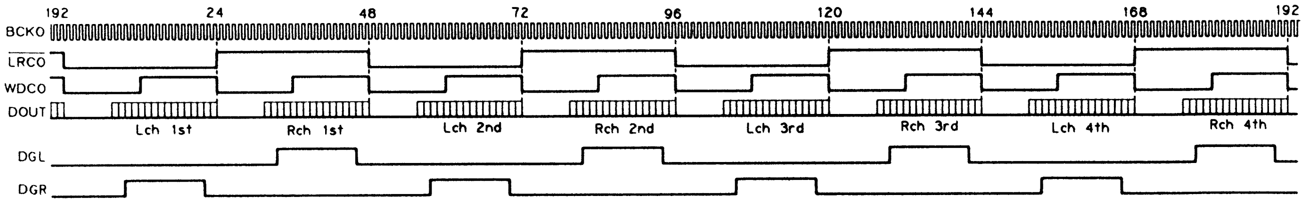

192 24 48 72 96 120 144 168 192
BCKO
LRCO
WDCO
DOUT
Lch 1st
Rch 1st
Lch 2nd
Rch 2nd
Lch 3rd
Rch 3rd
Lch 4th
Rch 4th
DGL
DGR

Fig. 6 Serial output timing (when $\overline{SCSL}$ is high or open)

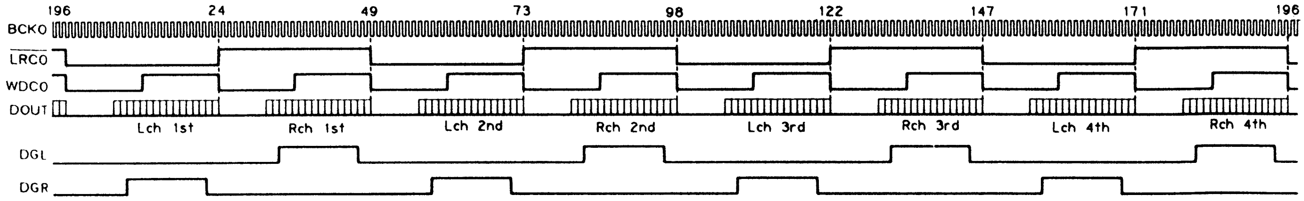

196 24 49 73 98 122 147 171 196
BCKO
LRCO
WDCO
DOUT
Lch 1st
Rch 1st
Lch 2nd
Rch 2nd
Lch 3rd
Rch 3rd
Lch 4th
Rch 4th
DGL
DGR

Fig. 7 Serial output timing (when $\overline{SCSL}$ is low)

Note: When $\overline{SCSL}$ is low, the WDCO output will not show the fixed period. However, DGL and DGR are fixed in 176.4 kHz (25% duty).

CIRCUIT DESCRIPTION

Characteristics of SM5807EP/ES

(Frequency 0 ~ 88.2 kHz)

Characteristics Item	Performance
Pass Band	0 ~ 20kHz
Rejection Band (Range)	Over 24.1 kHz
Band-pass Ripple	Within ±0.05 dB
Rejection Range Attenuation	
(24.1K ~ 40.0kHz)	45 dB or more
(over 40.0 kHz)	50 dB or more

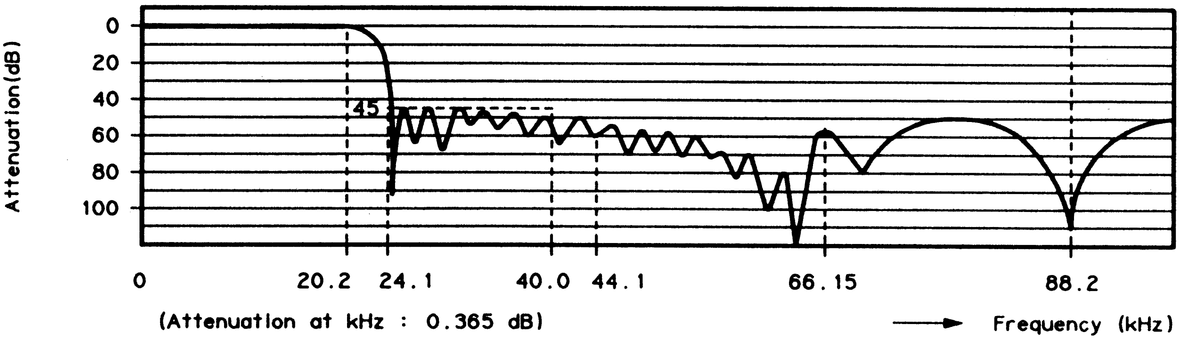


Fig. 8 SM5907EP/ES Frequency Response

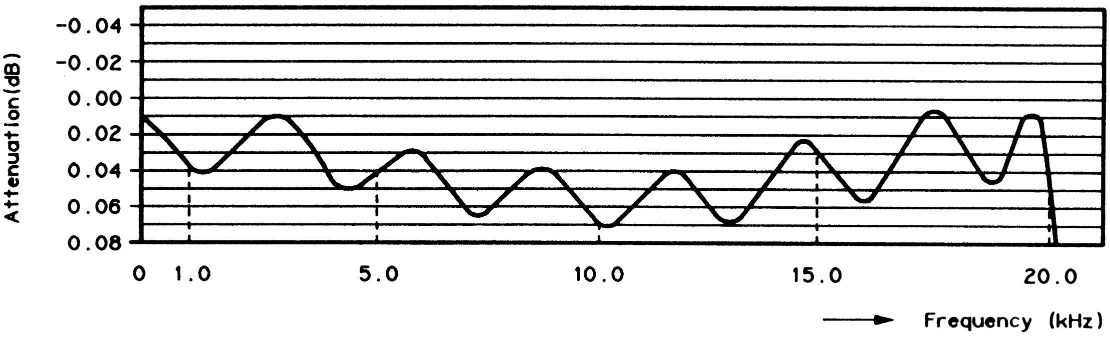


Fig. 9 SM5807EP/ES Pass-band Rejection Characteristics

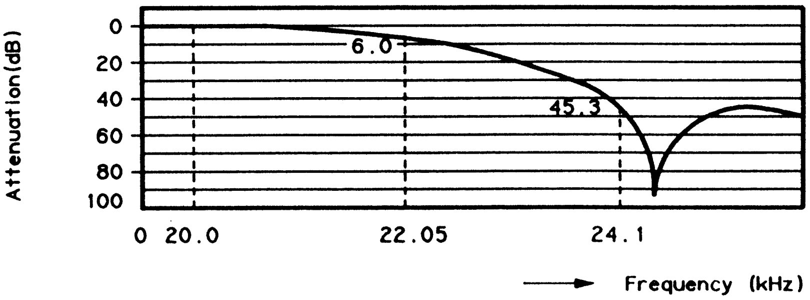


Fig. 10 S5807EP/ES Transition Band Characteristics

ADJUSTMENT/REGLAGE/ABGLEICH

ADJUSTMENT

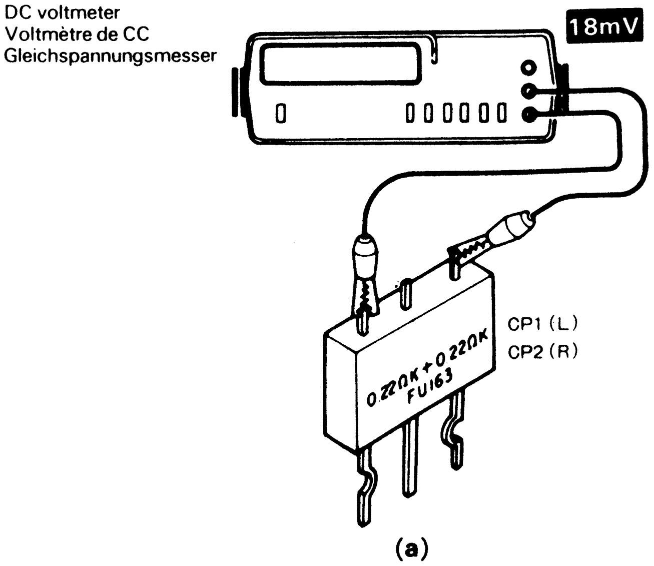
No.	ITEM	INPUT SETTINGS	OUTPUT SETTINGS	AMPLIFIER SETTINGS	ALIGNMENT POINTS	ALIGN FOR	FIG.
1	IDLE CURRENT	–	Connect a DC voltmeter across CP1 (L) CP2 (R) (X09-)	VOLUME: 0	VR1 (L) VR2 (R) (X89-)	18mV	(a)

REGLAGE

N°	ITEM	REGLAGE DE L'ENTREE	REGLAGE DE LA SORTIE	REGLAGE DE L'AMPLIFICATEUR	POINT L'ALIGNEMENT	ALIGNER POUR	
1	COURANT DE POLARISATION	–	Connecter un voltmètre de CC sur CP1 (G) CP2 (D) (X09-)	VOLUME: 0	VR1 (G) VR2 (D) (X89-)	18mV	(a)

ABGLEICH

NR.	GEGENSTAND	EINGANGS-EINSTELLUNG	AUSGANGS-EINSTELLUNG	VERSTÄRKER EINSTELLUNG	ABGLEICH-PUNKTE	ABGLEICHEN FÜR	ABB.
1	LEERLAUFSTROM	–	Einen Gleichspannungsmesser über CP1 (L) CP2 (R) anschließen. (X09-)	VOLUME: 0	VR1 (L) VR2 (R) (X89-)	18mV	(a)


DC voltmeter
Voltmètre de CC
Gleichspannungsmesser
18mV
0
000000
CP1 (L)
CP2 (R)
0.22ΩK+0.22ΩK
FU163

(a)

A-82

VOLTAGE CHECK TABLE

(X00-252X-XX)

	B	C	E
Q1	1.5V	ON 2.1V OFF −2.1V	2.1V
Q2	1.5V	—	2.1V
Q4	ON 2.1V OFF −2.1V	—	—
Q5	—	—	ON 2.1V OFF −2.1V
Q6	ON 2.1V OFF −2.1V	—	—
Q7	ON 2.1V OFF −2.1V	—	—
Q8	ON 2.1V OFF −2.1V	—	—

IC1

1	12.5V
2	0.6V
3	5.7V

(X09-273X-XX)

	B	C	E
Q1	0.6V	—	0V
Q2	0.6V	—	0V
Q3	0.6V	−4.2V	0V
Q4	−0.6V	−4.2V	0V
Q5	−0.6V	0V	−1.2V
Q6	−0.6V	0V	−1.2V
Q7	−0.6V	−13V	—
Q8	−13V	−22V	−12.4V

IC1

1	−12V
28	11.5V

IC2

1	−12V
28	11.5V

IC4

1	0V
2	—
3	0V
4	−12.4V
5	0V
6	0V
7	0V
8	12V

IC5

1	0V
2	0V
3	0V
4	−12.4V
5	0
6	0
7	0
8	12

(X11-256X-XX)

IC1

2	5V
64	5V

IC4

1	0.7V
2	0.6V
3	0V
4	0V
5	0V
6	0V
7	11.7V
8	11.7V
9	0.7V
10	0.6V

IC5

1	0V
2	0V
3	−16.8V
4	0V
5	16.8V

IC7

1	0V
2	0V
3	0V
4	−12V
5	0V
6	0V
7	0V
8	12V

(X13-5800-00)

IC1

1	0V	5	0V
2	0V	6	0V
3	0V	7	0V
4	−12V	8	12V

(X-13-6140-00)

IC1

7	−13V
14	12V

(X85-103X-XX)
(X85-111X-XX)

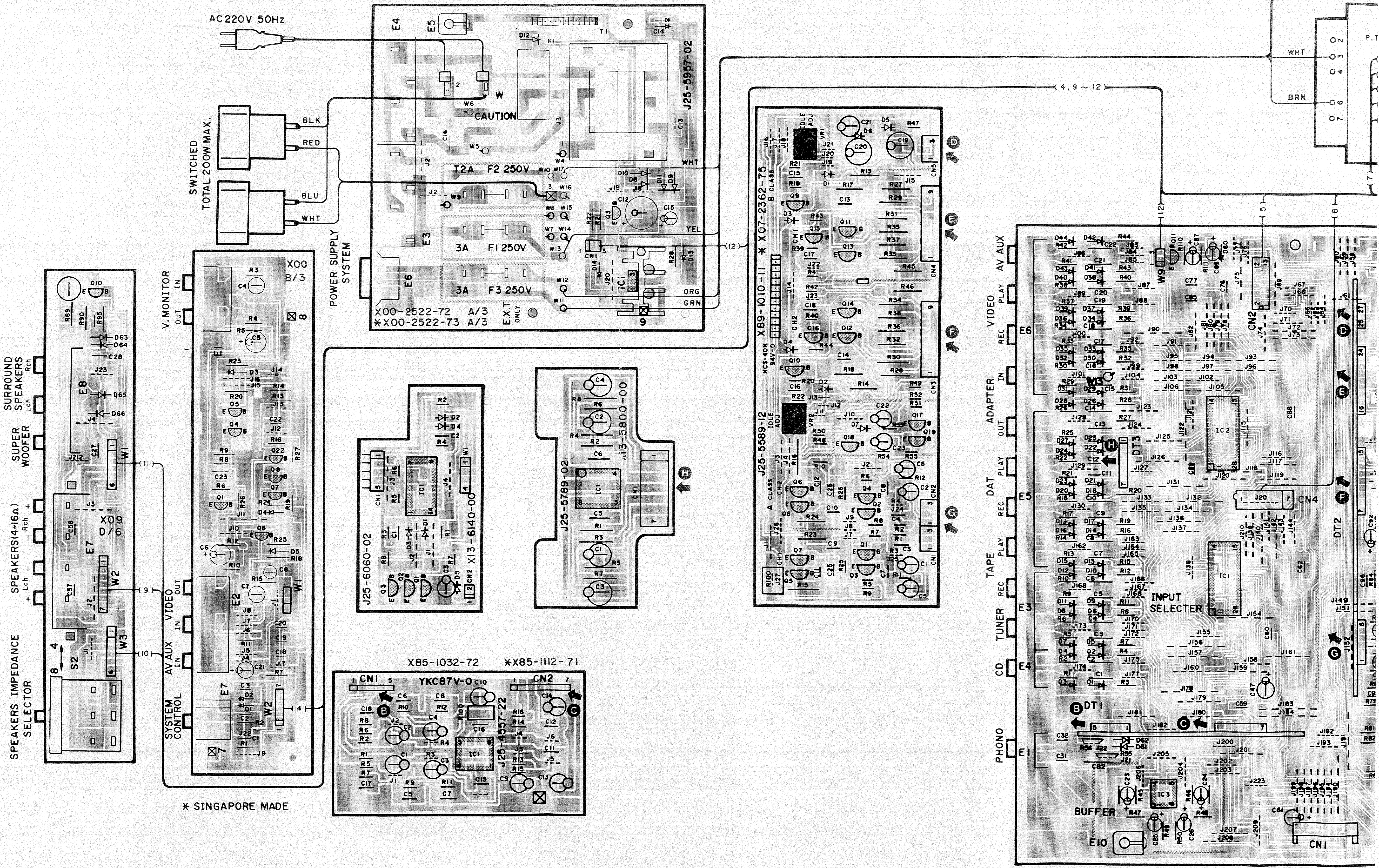
IC1

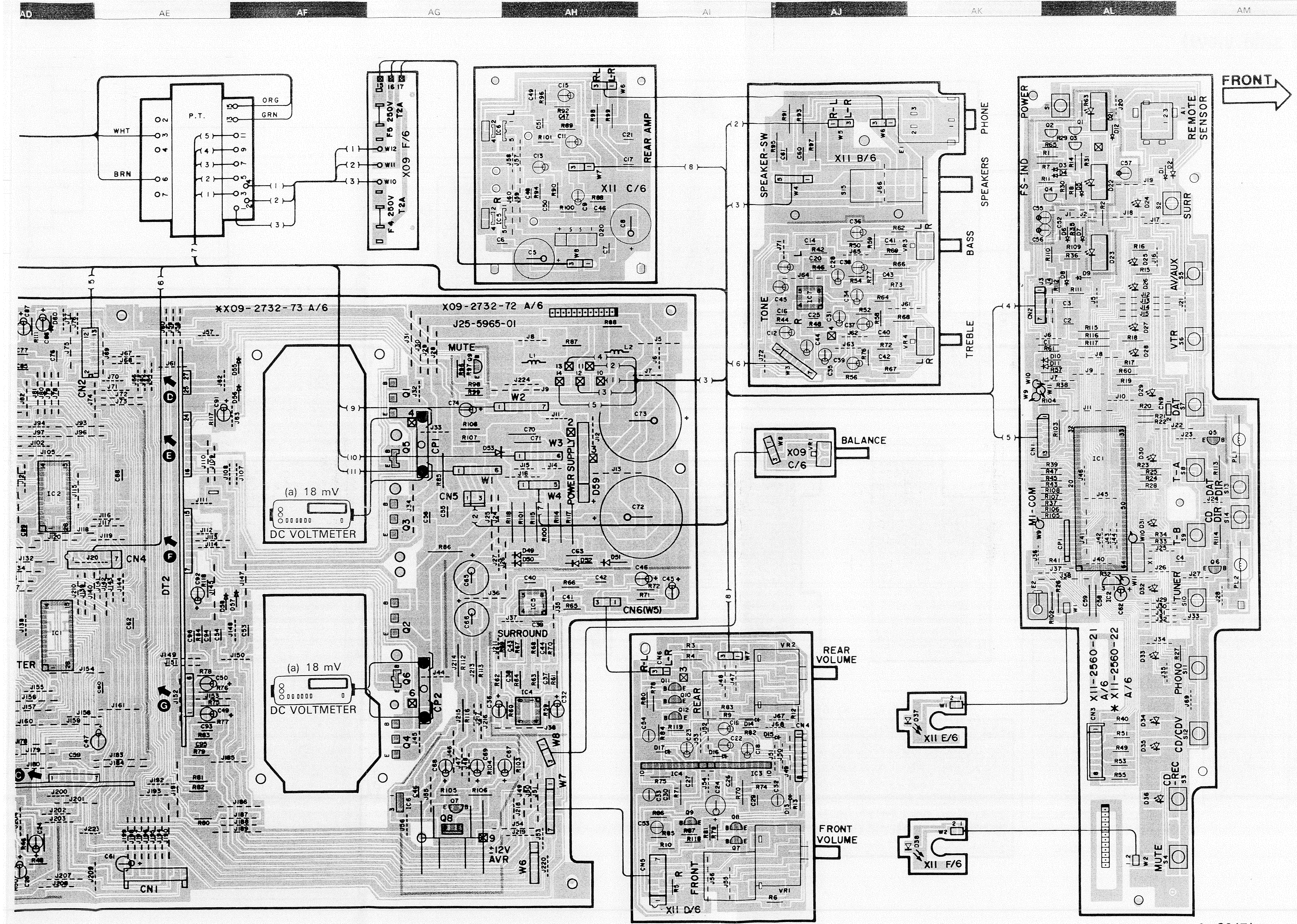
1	0V	5	0V
2	0V	6	0V
3	0V	7	0V
4	−12V	8	12V

(X89-101X-XX)

	B	C	E		B	C	E
Q1	0V	−38.0V	0.7V	Q11	1.2V	42.0V	0.6V
Q2	—	—	—	Q12	—	—	—
Q3	0	−38.0V	0.7V	Q13	−1.2V	−42.0V	−0.6V
Q4	—	—	—	Q14	—	—	—
Q5	−38.0V	20.8V	−38.6V	Q15	—	—	—
Q6	—	—	—	Q16	—	—	—
Q7	−38.0V	—	−38.6V	Q17	12.0V	12.0V	12.0V
Q8	—	—	—	Q18	—	12.0V	—
Q9	39.4V	—	40.0V	Q19	11.8V	12.0V	11.2V
Q10	—	—	—				

P.C. BOARD (Foil side view)

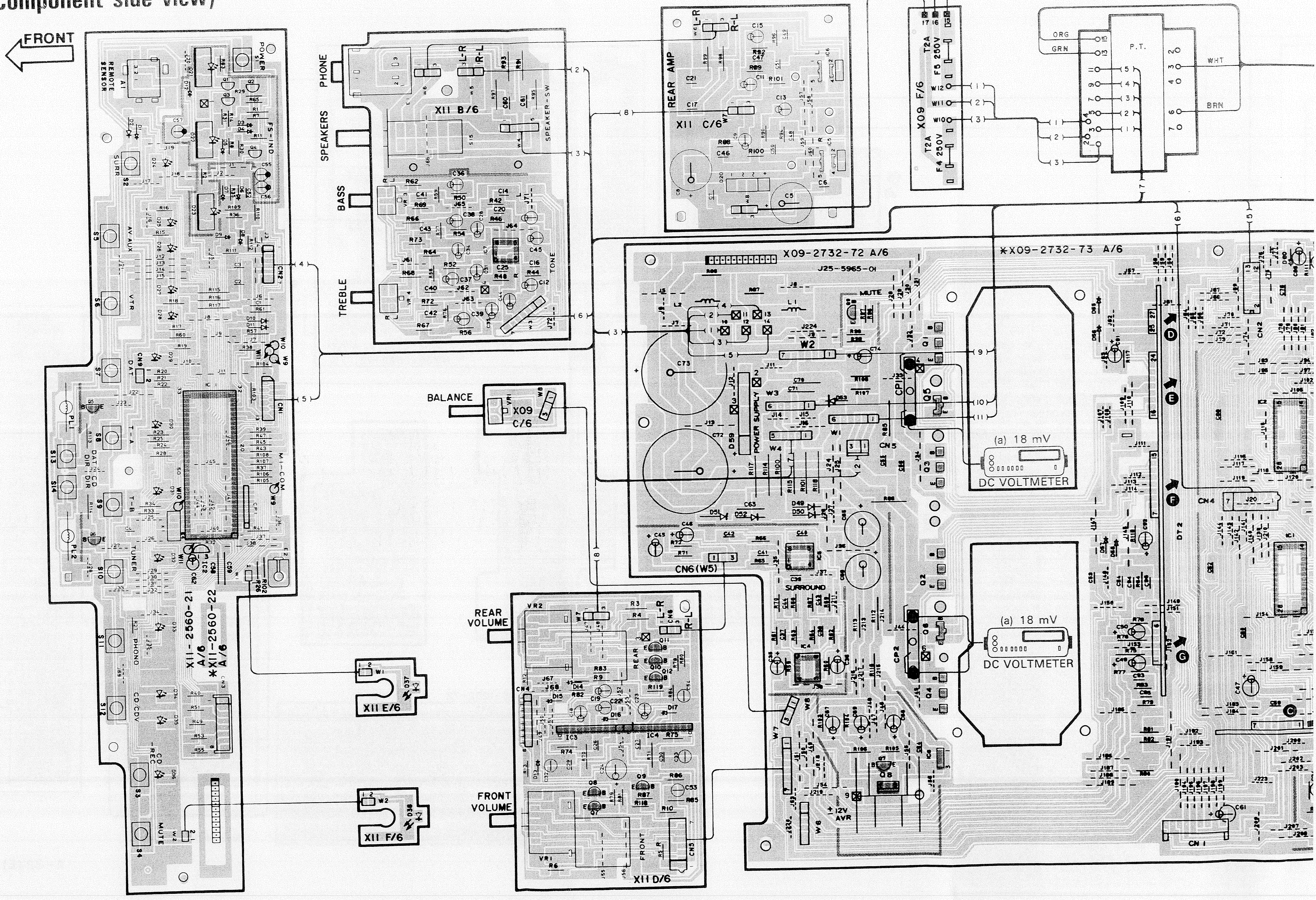

AC220V 50Hz
SWITCHED TOTAL 200W MAX.
BLK
RED
BLU
WHT
POWER SUPPLY SYSTEM
X00-2522-72 A/3
✻X00-2522-73 A/3
E.X.T ONLY
J25-5957-02
CAUTION
T2A F2 250V
3A F1 250V
3A F3 250V
WHT
YEL
ORG
GRN
(4, 9 ~ 12)
(12)
X00 B/3
V.MONITOR IN OUT
VIDEO OUT IN
AV AUX IN
SYSTEM CONTROL
SURROUND SPEAKERS Rch Lch
SUPER WOOFER
SPEAKERS(4-16Ω) Rch Lch
SPEAKERS IMPEDANCE SELECTOR
X09 D/6
S2
(11)
(9)
(10)
(4)
J25-6060-02
X13-6140-00
J25-5789-02
X13-5800-00
X85-1032-72
✻X85-1112-71
YKC87V-0
CN1
CN2
J25-4557-22
X89-1010-11
✻X07-2362-75
J25-5589-12
IDLE ADJ
B CLASS
A CLASS
CN1
CN2
CN3
CN4
CN5
AV AUX
VIDEO PLAY REC
ADAPTER IN OUT
DAT PLAY REC
TAPE PLAY REC
TUNER
CD
PHONO
E6
E5
E3
E4
E1
E10
IC1
IC2
IC3
INPUT SELECTER
BUFFER
DT1
DT2
DT3
CN1
CN2
CN4
WHT
BRN
✻ SINGAPORE MADE

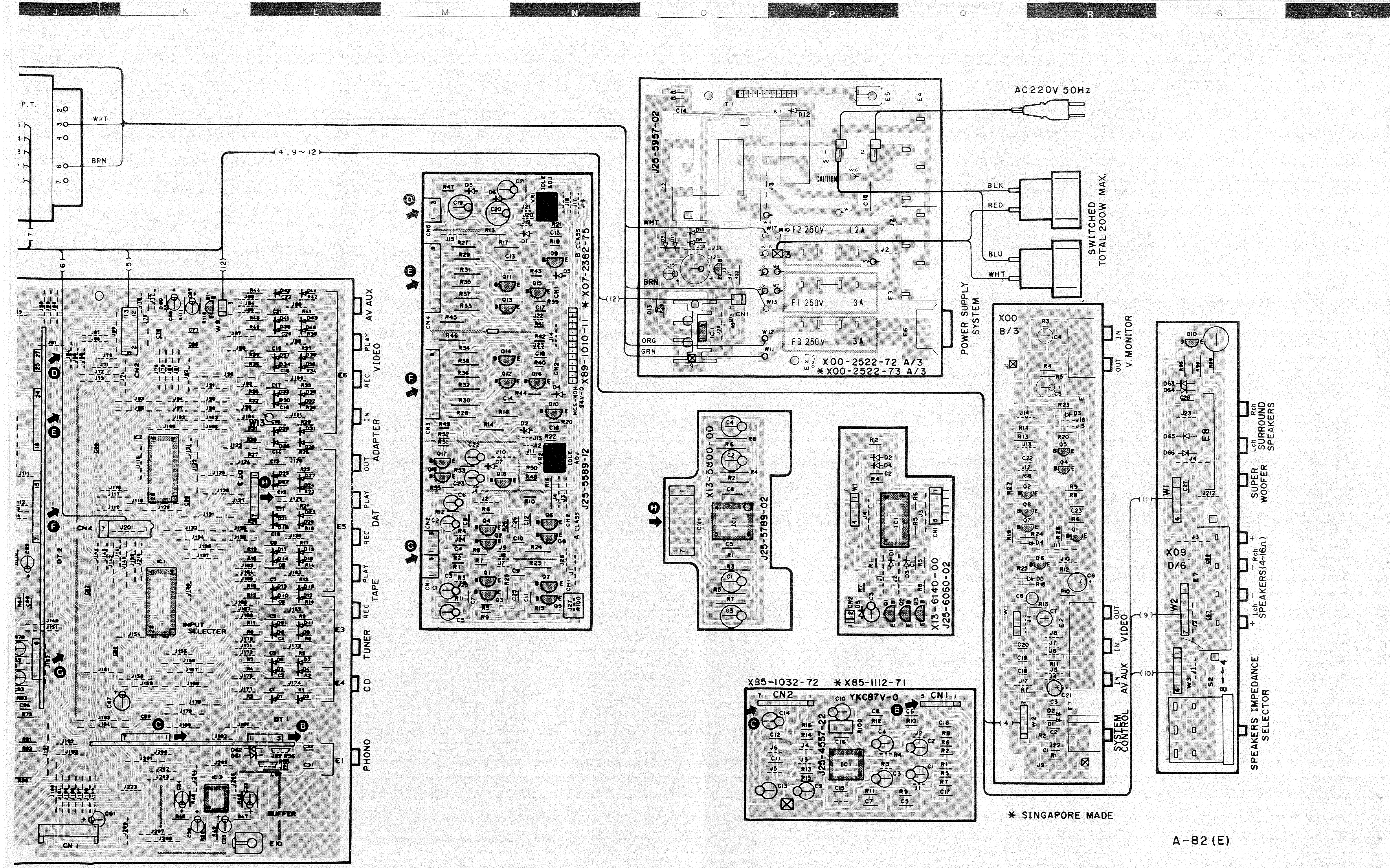

AD
AE
AF
AG
AH
AI
AJ
AK
AL
AM
AN
P.T.
WHT
BRN
ORG
GRN
F5 250V T2A
F4 250V T2A
X09 F/6
REAR AMP
X11 C/6
SPEAKER-SW
X11 B/6
PHONE
SPEAKERS
BASS
TONE
TREBLE
FRONT
POWER
FS-IND
REMOTE SENSOR
SURR
AV/AUX
VTR
DAT
T-A
CD DIR
DAT DIR
T-B
TUNER
PHONO
CD/CDV
CD-REC
MUTE
MI-COM
*X09-2732-73 A/6
X09-2732-72 A/6
J25-5965-01
MUTE
POWER SUPPLY
SURROUND
(a) 18 mV
DC VOLTMETER
(a) 18 mV
DC VOLTMETER
CN4
DT2
CN1
+12V AVR
BALANCE
X09 C/6
REAR VOLUME
FRONT VOLUME
REAR
FRONT
X11 D/6
X11 E/6
X11 F/6
X11-2560-21 A/6
* X11-2560-22 A/6

A-82(E)

Refer to the schematic diagram for the values of resistors and capacitors.

P.C. BOARD (Component side view)


FRONT
REMOTE SENSOR
POWER
FS-IND
SURR
AV AUX
VTR
DAT
T-A
DAT DIR
CD DIR
T-B
TUNER
PHONO
CD CDV
CD REC
MUTE
MI-COM
X11-2560-21 A/6
*X11-2560-22 A/6
PHONE
SPEAKERS
BASS
TREBLE
TONE
SPEAKER-SW
X11 B/6
REAR AMP
X11 C/6
X09 F/6
T2A F5 250V
T2A F4 250V
P.T.
ORG
GRN
WHT
BRN
X09-2732-72 A/6
*X09-2732-73 A/6
J25-5965-01
MUTE
POWER SUPPLY
(a) 18 mV
DC VOLTMETER
(a) 18 mV
DC VOLTMETER
BALANCE
X09 C/6
X11 E/6
X11 F/6
REAR VOLUME
FRONT VOLUME
X11 D/6
SURROUND
CN6(W5)
+12V AVR
CN1
CN2
CN4
CN5
DT2

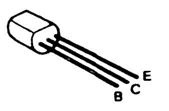

J
K
L
M
N
O
P
Q
R
S
T
P.T.
WHT
BRN
(4, 9 ~ 12)
AC220V 50Hz
SWITCHED TOTAL 200W MAX.
BLK
RED
BLU
WHT
J25-5957-02
CAUTION
F2 250V T2A
F1 250V 3A
F3 250V 3A
X00-2522-72 A/3
✻X00-2522-73 A/3
POWER SUPPLY SYSTEM
ORG
GRN
X07-2362-75
X89-1010-11
J25-5589-12
B CLASS
A CLASS
IDLE ADJ
AV AUX
VIDEO
PLAY
REC
ADAPTER
IN
OUT
DAT
TAPE
TUNER
CD
PHONO
E6
E5
E3
E4
E1
CN4
CN2
CN1
DT2
DT1
IC1
IC2
IC3
INPUT SELECTER
BUFFER
X13-5800-00
J25-5789-02
X13-6140-00
J25-6060-02
X85-1032-72
✻X85-1112-71
CN2
CN1
YKC87V-0
J25-4557-22
X00 B/3
V.MONITOR
VIDEO
AV AUX
SYSTEM CONTROL
X09 D/6
SURROUND SPEAKERS
Rch
Lch
SUPER WOOFER
SPEAKERS(4~16Ω)
SPEAKERS IMPEDANCE SELECTOR
S2
8 ←→ 4
W1
W2

✻ SINGAPORE MADE

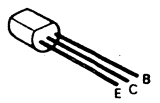
A-82 (E)

Refer to the schematic diagram for the values of resistors and capacitors.

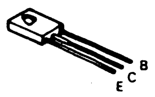
DTA124EN



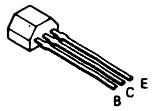
DTC124EN
2SA733(A)
2SA992
2SA999
2SC1845
2SC1923
2SC2003
2SC2320
2SC2878
2SC945(A)
2SD1302



2SA1110
2SC2590

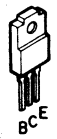


2SA933S

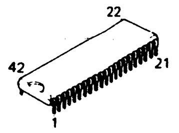


2SC4137

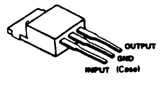
2SB941



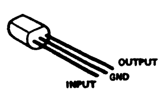
AN6556
M5218P
UPC4570C



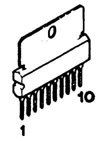
UPC7805HF
UPC7812HF


OUTPUT
GND
INPUT (Case)

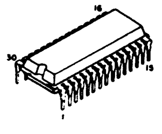
M51951ASL


OUTPUT
GND
INPUT

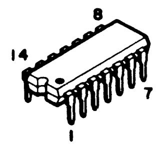
BA6109



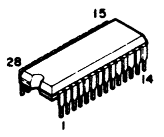
M50461-057SP



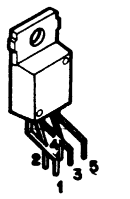
LC4966



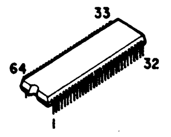
TC9163N
TC9164N



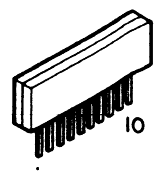
UPC1238V*1

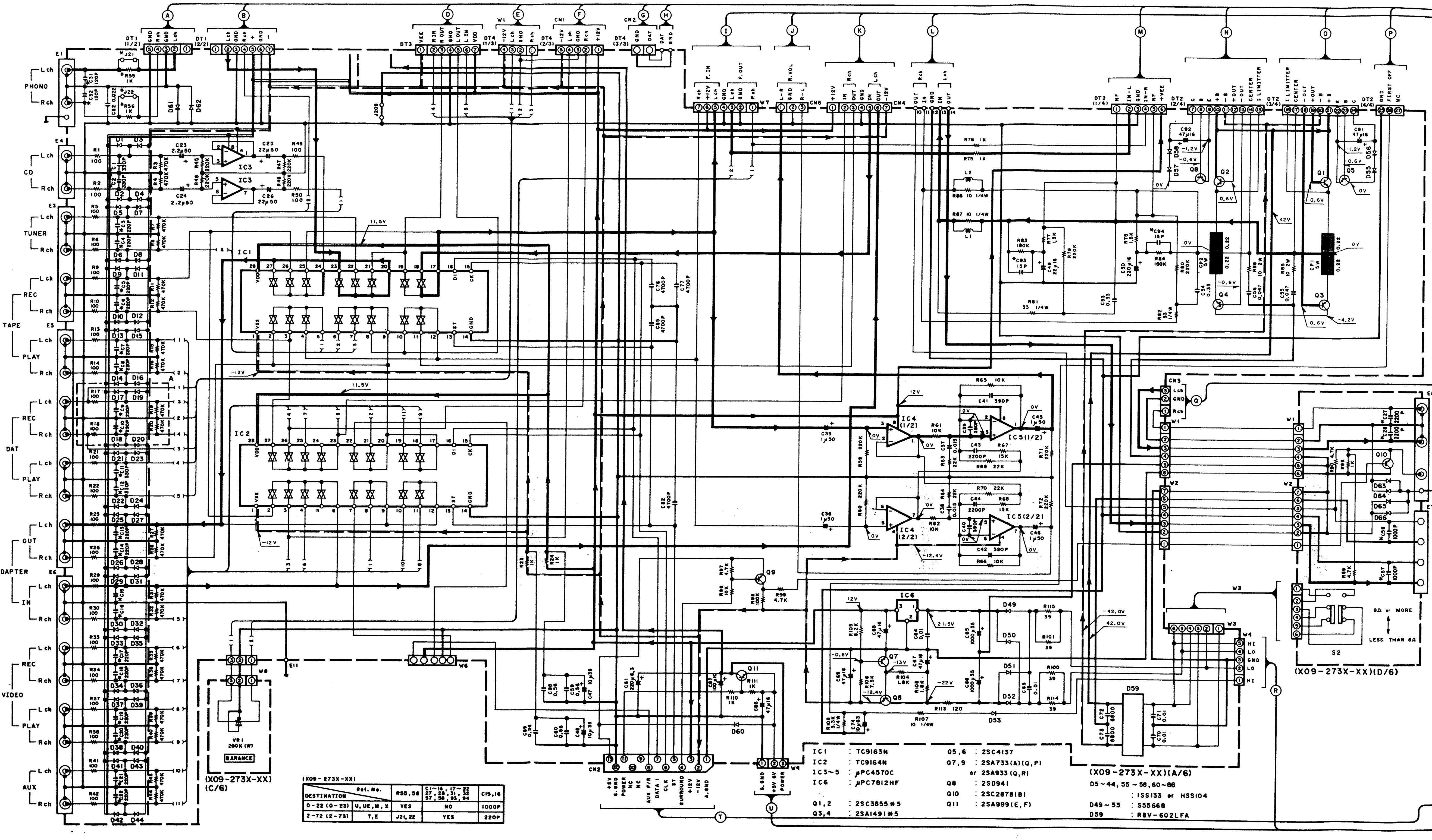


CXP5016-315S



LB1641




PHONO
Lch
Rch
CD
TUNER
TAPE
REC
PLAY
DAT
OUT
ADAPTER
IN
VIDEO
AUX
IC1
IC2
IC3
IC4
IC5
IC6
VR1
200K (W)
BARANCE
(X09-273X-XX)
(C/6)
(X09-273X-XX)(D/6)
S2
8Ω or MORE
LESS THAN 8Ω
CN2
W4
+5V
6.3V
POWER
NC
AUX F/R
DATA
CLK
ST
SURROUND
+12V
-12V
A.GND
D59

(X09-273X-XX)

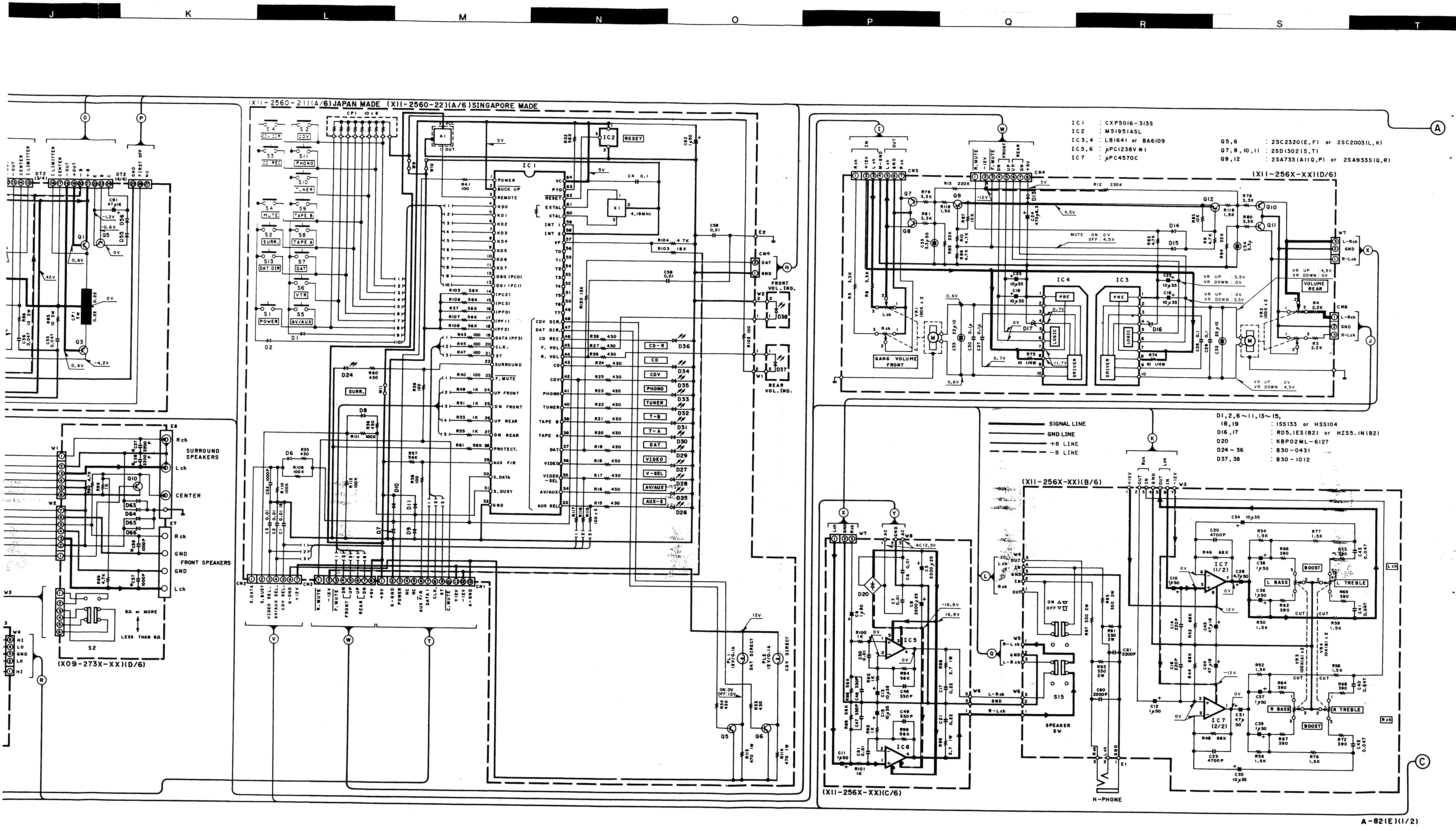
DESTINATION \ Ref. No.		R55,56	C1~14, 17~22 27, 28, 31, 32 57, 58, 93, 94	C15,16
0-22 (0-23)	U, UE, M, X	YES	NO	1000P
2-72 (2-73)	T, E	J21, 22	YES	220P

IC1 : TC9163N
IC2 : TC9164N
IC3~5 : μPC4570C
IC6 : μPC7812HF
Q1,2 : 2SC3855*5
Q3,4 : 2SA1491*5
Q5,6 : 2SC4137
Q7,9 : 2SA733(A)(Q,P)
or 2SA933(Q,R)
Q8 : 2SD941
Q10 : 2SC2878(B)
Q11 : 2SA999(E,F)

(X09-273X-XX)(A/6)

D5~44, 55~58, 60~66 : 1SS133 or HSS104
D49~53 : S5566B
D59 : RBV-602LFA

CAUTION: For
nents only with
list). ⚠ Indicates
electric shock, le
carried out (expo
circuit) before th


J
K
L
M
N
O
P
Q
R
S
T
(X11-2560-21)(A/6) JAPAN MADE (X11-2560-22)(A/6) SINGAPORE MADE
IC1 : CXP5016-313S
IC2 : M51951ASL
IC3,4 : LB1641 or BA6109
IC5,6 : μPC1238V *1
IC7 : μPC4570C
Q5,6 : 2SC2320(E,F) or 2SC2003(L,K)
Q7,8,10,11 : 2SD1302(S,T)
Q9,12 : 2SA733(A)(Q,P) or 2SA933S(Q,R)
(X11-256X-XX)(D/6)
D1,2,6~11,13~15, 18,19 : 1SS133 or HSS104
D16,17 : RD5.1ES(B2) or HZS5.1N(B2)
D20 : KBP02ML-6127
D24~36 : B30-0431
D37,38 : B30-1012
SIGNAL LINE
GND LINE
+B LINE
−B LINE
(X11-256X-XX)(B/6)
(X11-256X-XX)(C/6)
(X09-273X-XX)(D/6)
SURROUND SPEAKERS
FRONT SPEAKERS
CENTER
8Ω or MORE
LESS THAN 8Ω
GANG VOLUME FRONT
VOLUME REAR
FRONT VOL. IND.
REAR VOL. IND.
SPEAKER SW
H-PHONE
L BASS
L TREBLE
R BASS
R TREBLE
BOOST
MUTE ON : 0V OFF : 4.5V
VR UP : 3.5V VR DOWN : 0V
VR UP : 0V VR DOWN : 3.5V
VR UP : 4.5V VR DOWN : 0V
VR UP : 0V VR DOWN : 4.5V
DAT DIRECT
CDV DIRECT
ON : 0V OFF : 12V

A-82(E)(1/2)

CAUTION: For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list). ⚠ Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

DC voltages are as measured with a high impedance voltmeter. during reception of the FM broadcast signal (with a signal strength of 60 dB at the ANT terminal). Values may vary slightly due to variations between individual instruments or/and units.

Les tensions c.c. doivent être measurées avec un voltmètre à haute impédance pendant la réception d'un signal de programme FM (avec une force der signal de 60 dB à la borne ANT). Les valeurs peuvent différer légèrement du fait des variations inhérentes aux appareils et aux instruments de mesure individuels.

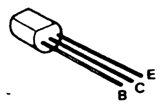
Die angegebenen Gleichspannungswerte wurden mit einem hochohmigen Spannungsmesser bei Empfang eines UKW-Signals (mit einer Feldstärke von 60 dB am Antennenanschluß) gemessen. Dabei schwanken die Meßwerte aufgrunt von Unterschieden zwischen einzelnen Instrumenten oder Geräten u.U. geringfügig.

Y08-3610-80

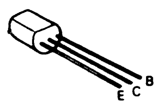
A-82

KENWOOD

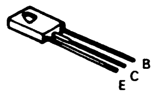
DTA124EN



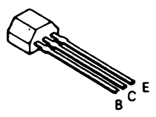
DTC124EN
2SA733(A)
2SA992
2SA999
2SC1845
2SC1923
2SC2003
2SC2320
2SC2878
2SC945(A)
2SD1302



2SA1110
2SC2590

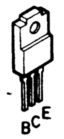


2SA933S

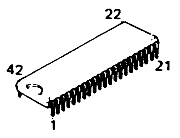


2SC4137

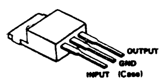
2SB941



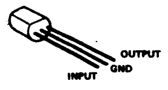
AN6556
M5218P
UPC4570C



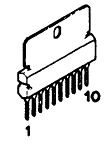
UPC7805HF
UPC7812HF

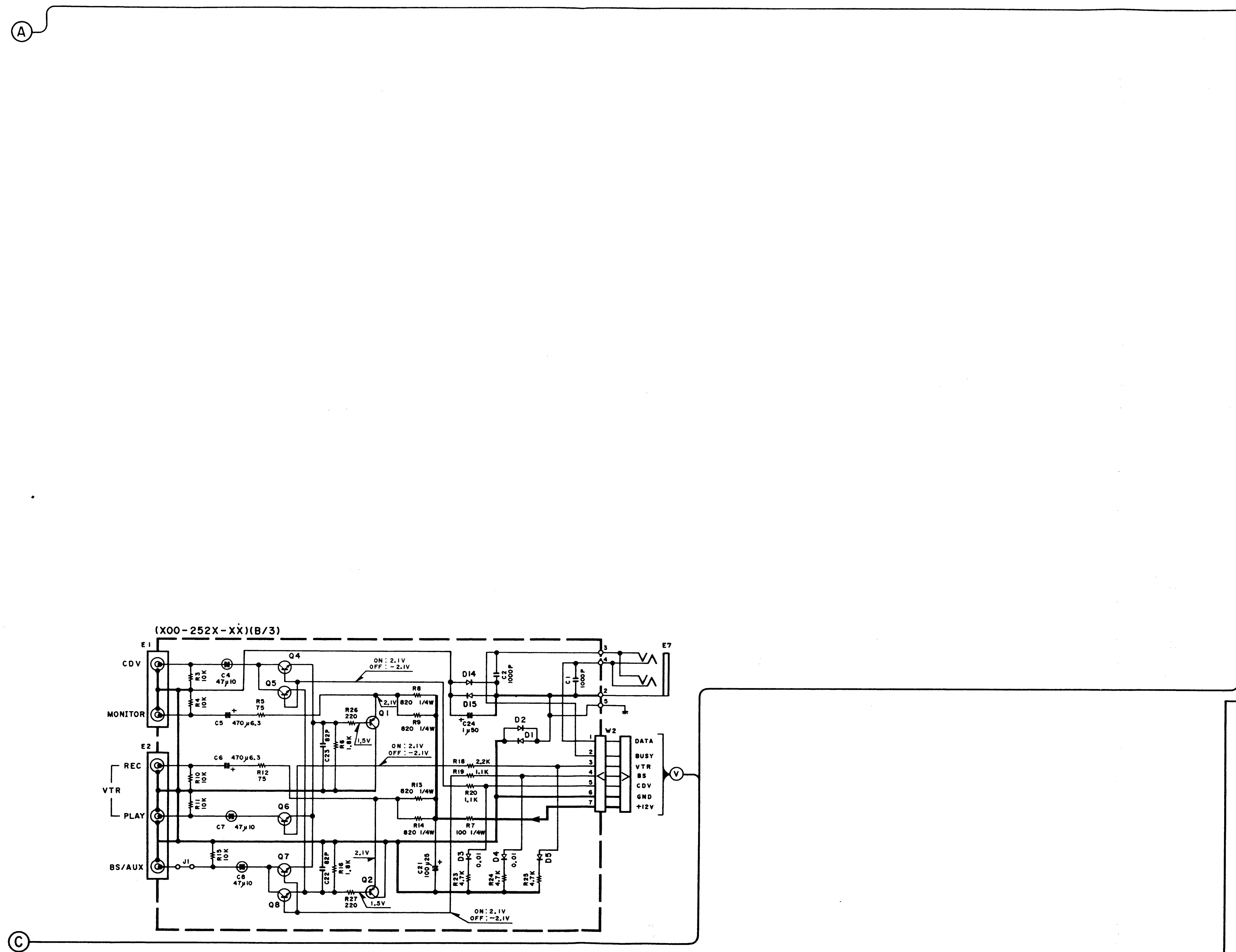

OUTPUT
GND
INPUT (Case)

M51951ASL

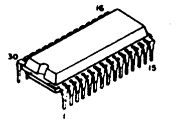

OUTPUT
GND
INPUT

BA6109

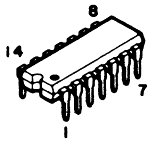



A
C
(X00-252X-XX)(B/3)
E1
CDV
MONITOR
E2
REC
VTR
PLAY
BS/AUX
J1
R3 10K
R4 10K
C4 47μ10
C5 470μ6.3
R5 75
C6 470μ6.3
R12 75
R10 10K
R11 10K
C7 47μ10
R15 10K
C8 47μ10
Q4
Q5
Q6
Q7
Q8
Q1
Q2
ON : 2.1V
OFF : -2.1V
R26 220
R8 820 1/4W
R9 820 1/4W
C23 82P
R6 1.8K
1.5V
2.1V
R13 820 1/4W
R14 820 1/4W
R18 2.2K
R19 1.1K
R20 1.1K
R7 100 1/4W
C22 82P
R16 1.8K
R27 220
C21 100μ25
R23 4.7K
R24 4.7K
R25 4.7K
D3
D4
D5
0.01
D14
D15
C2 1000P
C1 1000P
C24 1μ50
D2
D1
E7
W2
DATA
BUSY
VTR
BS
CDV
GND
+12V
V

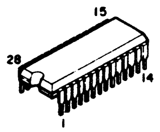
M50461-057SP



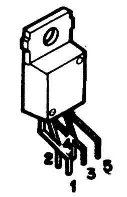
LC4966



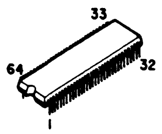
TC9163N
TC9164N



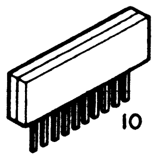
UPC1238V✱1

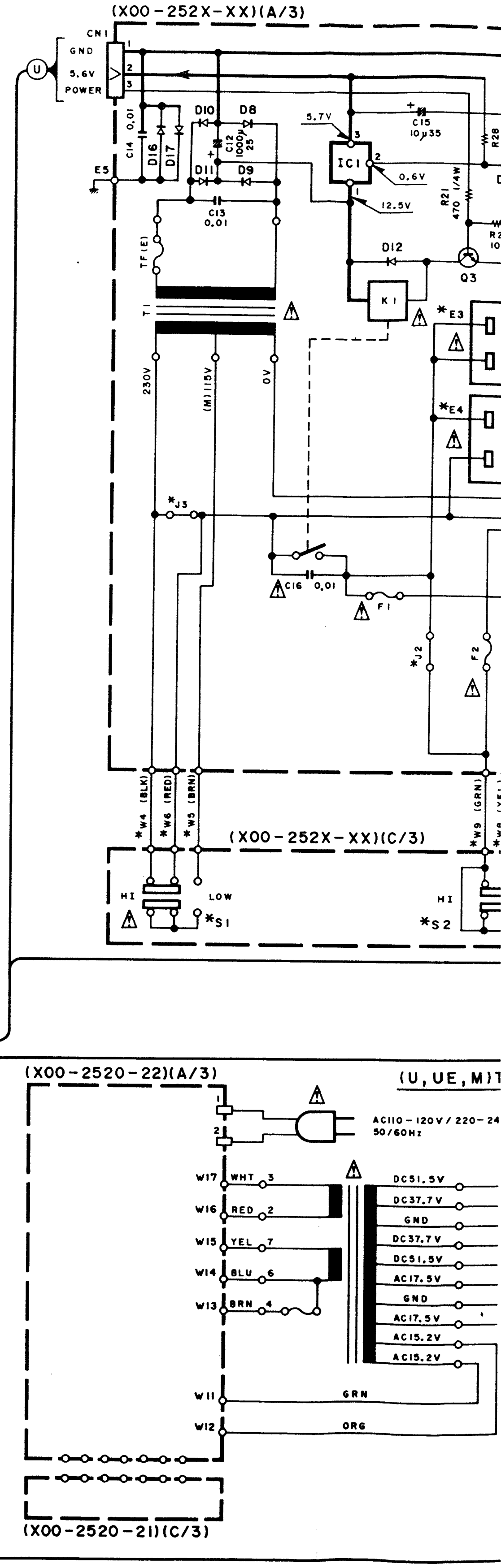


CXP5016-315S

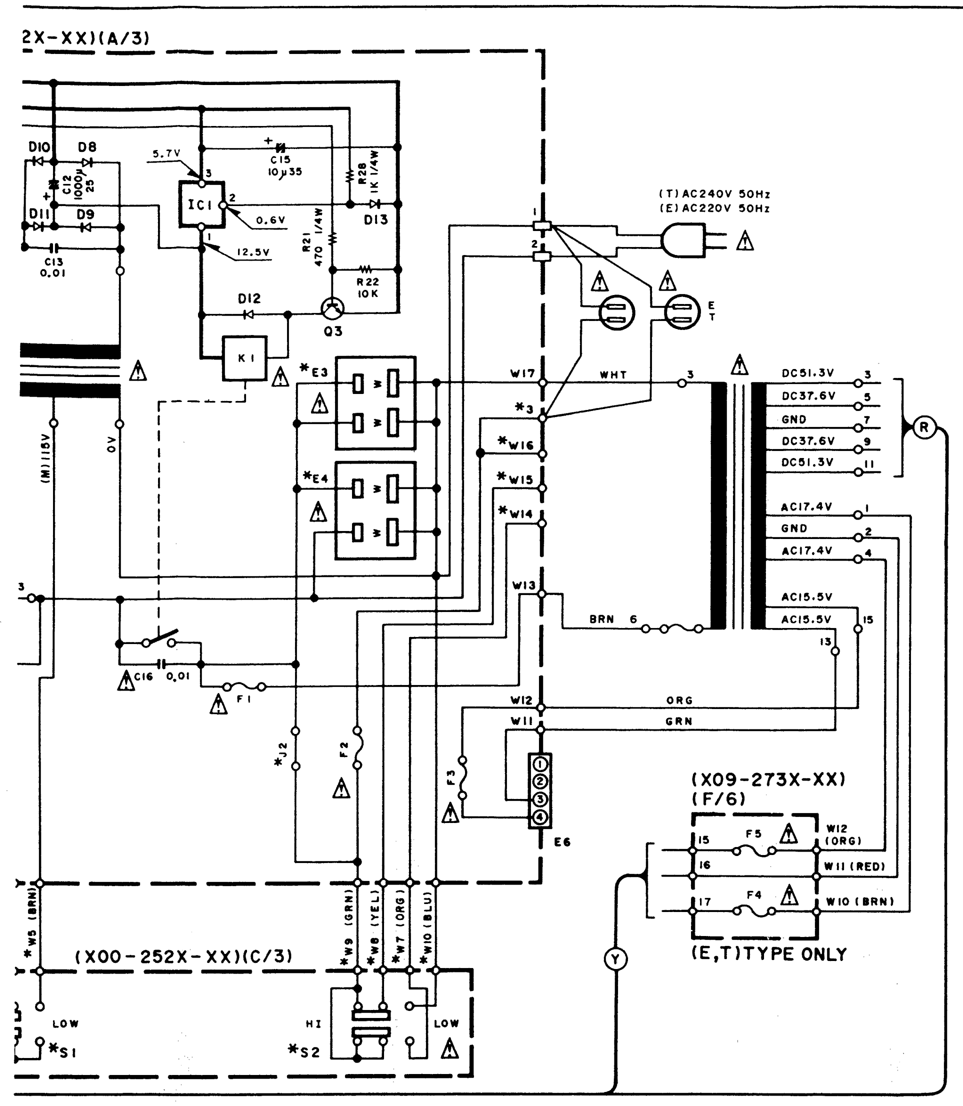


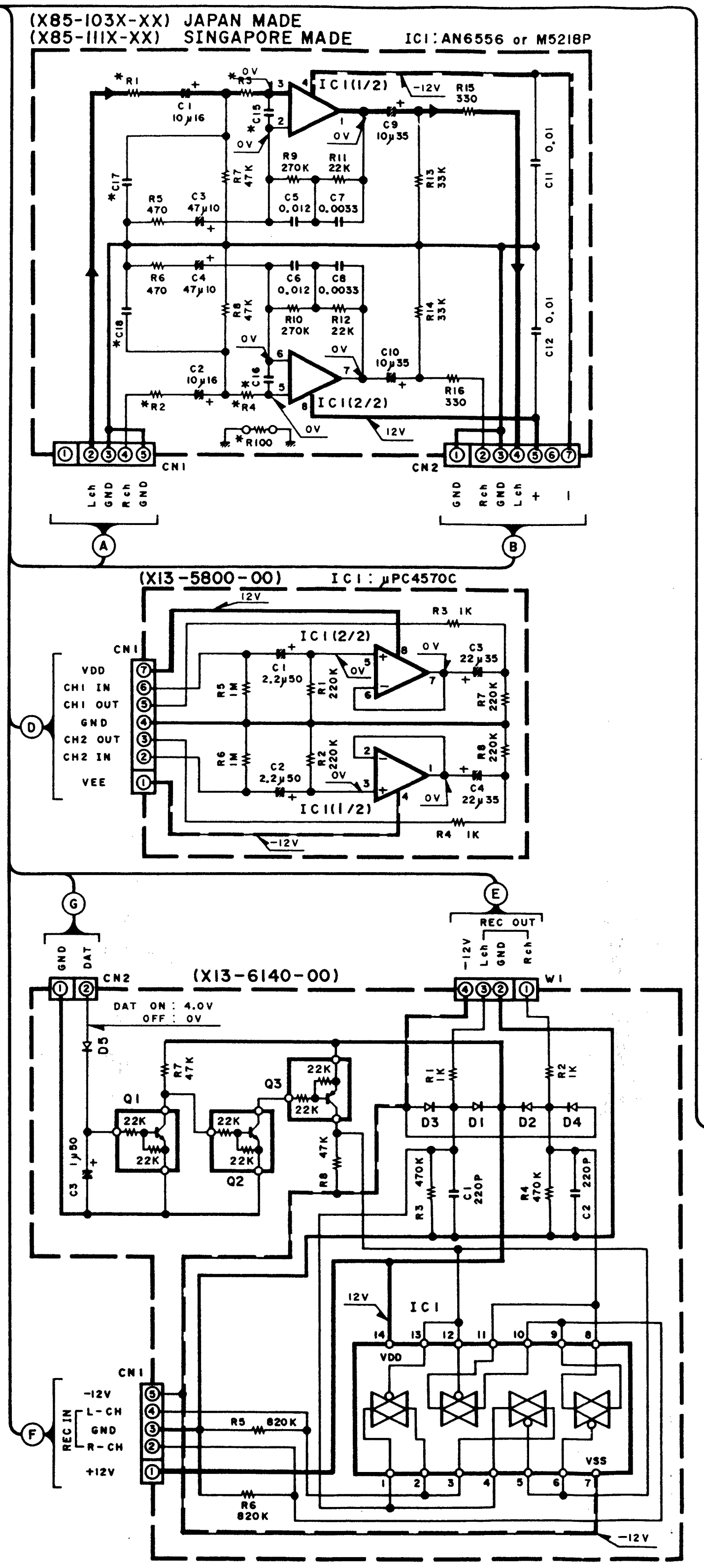
LB1641

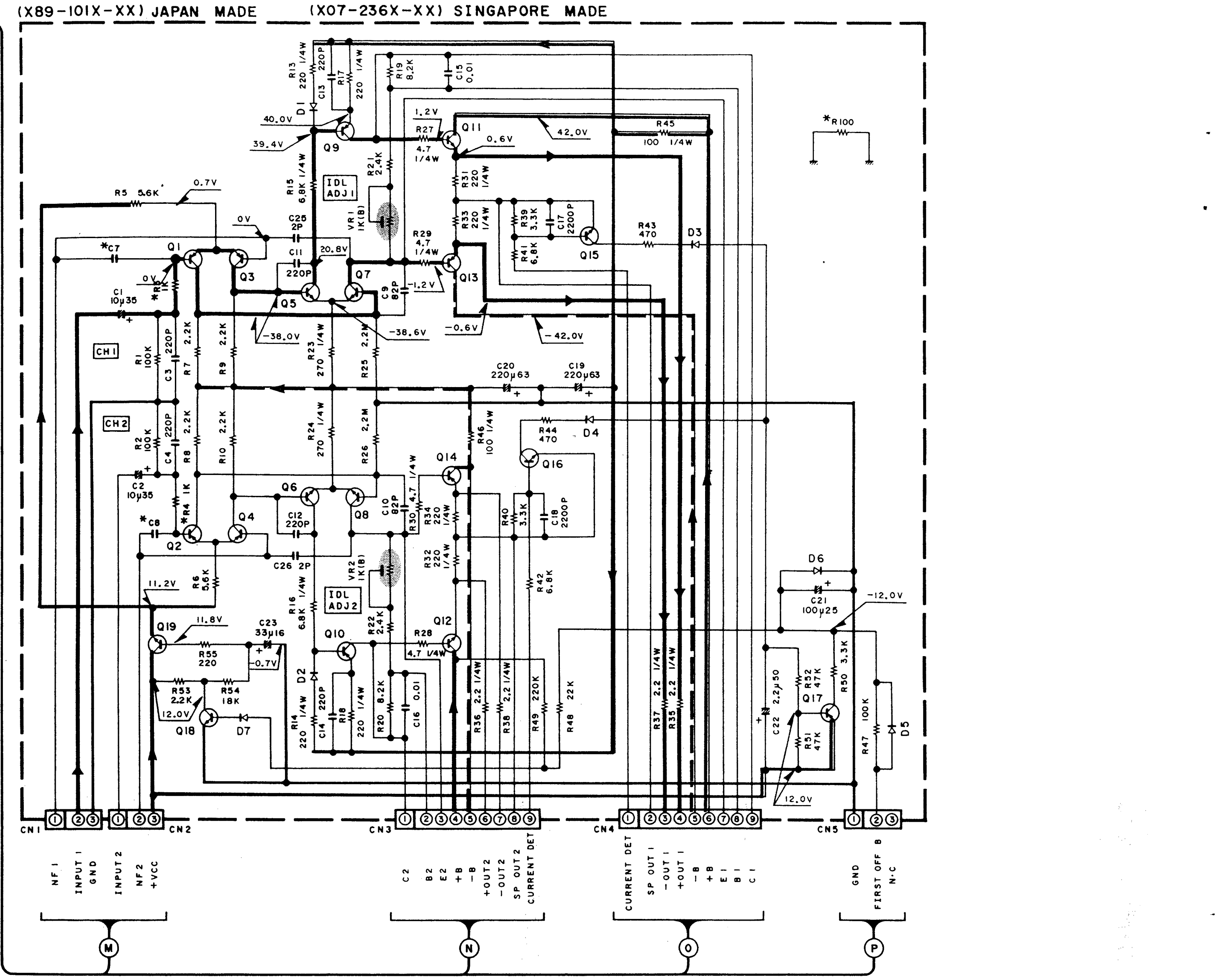



(X00-252X-XX)(A/3)
CN1
GND
5.6V
POWER
U
E5
C14 0.01
D16
D17
D10
D8
D11
D9
C12 1000μ 25
C13 0.01
5.7V
C15 10μ35
IC1
0.6V
12.5V
R21 470 1/4W
D12
Q3
K1
TF(E)
T1
230V
(M)115V
0V
*E3
*E4
*J3
C16 0.01
F1
*J2
F2
*W4 (BLK)
*W6 (RED)
*W5 (BRN)
(X00-252X-XX)(C/3)
HI
LOW
*S1
*S2
(X00-2520-22)(A/3)
(U,UE,M)T
AC110-120V/220-24
50/60Hz
W17 WHT 3
W16 RED 2
W15 YEL 7
W14 BLU 6
W13 BRN 4
DC51.5V
DC37.7V
GND
DC37.7V
DC51.5V
AC17.5V
GND
AC17.5V
AC15.2V
AC15.2V
W11 GRN
W12 ORG
(X00-2520-21)(C/3)

CAUTION: For continu
nents only with manufac
list). ⚠ Indicates safety
electric shock, leakage-cu
carried out (exposed part
circuit) before the applia


(X00-252X-XX)(A/3)
(T)AC240V 50Hz
(E)AC220V 50Hz
IC1
K1
Q3
DC51.3V
DC37.6V
GND
DC37.6V
DC51.3V
AC17.4V
GND
AC17.4V
AC15.5V
AC15.5V
WHT
BRN
ORG
GRN
(X09-273X-XX)
(F/6)
W12 (ORG)
W11 (RED)
W10 (BRN)
(E,T)TYPE ONLY
(X00-252X-XX)(C/3)
LOW
HI
*S1
*S2


(X85-103X-XX) JAPAN MADE
(X85-111X-XX) SINGAPORE MADE
IC1 : AN6556 or M5218P
IC1(1/2)
IC1(2/2)
CN1
CN2
Lch GND Rch GND
GND Rch GND Lch + I
(X13-5800-00)
IC1 : μPC4570C
VDD
CH1 IN
CH1 OUT
GND
CH2 OUT
CH2 IN
VEE
(X13-6140-00)
DAT ON : 4.0V
OFF : 0V
REC OUT
REC IN
-12V
L-CH
GND
R-CH
+12V
VDD
VSS


(X89-101X-XX) JAPAN MADE
(X07-236X-XX) SINGAPORE MADE
CH1
CH2
IDL ADJ1
IDL ADJ2
CN1
CN2
CN3
CN4
CN5
NF1
INPUT1
GND
INPUT2
NF2
+VCC
C2
B2
E2
+B
-B
+OUT2
SP OUT2
CURRENT DET
CURRENT DET
SP OUT1
-OUT1
+OUT1
-B
+B
E1
B1
C1
GND
FIRST OFF B
N-C

(X00-252X-XX)

DESTINATION		J2	J3	W4 ~10	W14 ~16	3	E3,4	S1,2
0-22(0-23)	U,UE,M	NO	NO	YES	YES	NO	YES	YES
2-72(2-73)	T,E	YES	YES	NO	NO	YES	NO	NO

( ):SINGAPORE MADE

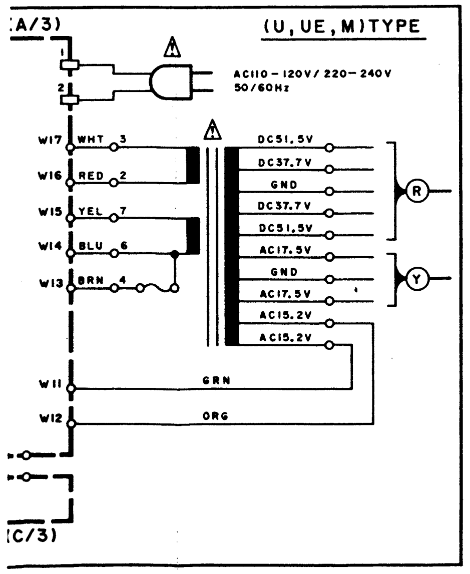
(X85-103X-XX)
(X85-111X-XX)

DESTINATION		R1,2	R3,4	C15,16	C17,18	R100
0-14(0-11)	U,UE,M,X	100	J	560P	100P	22(10)
2-73(2-72)	T,E	1K	100	2200P	220P	33(27)

( ):SINGAPORE MADE

(X89-101X-XX) (X07-236X-XX)

DESTINATION		R3,4	C7,8	R100
0-09(0-13)	U,UE,M,T	J	120P	91
0-11(2-75)	T,E	1K	100P	11


(A/3)
(U,UE,M)TYPE
AC110-120V/220-240V
50/60Hz
W17 WHT
W16 RED
W15 YEL
W14 BLU
W13 BRN
DC51.5V
DC37.7V
GND
DC37.7V
DC51.5V
AC17.5V
GND
AC17.5V
AC15.2V
AC15.2V
W11
W12
GRN
ORG
(C/3)

(X00-252X-XX)
IC1 : μPC7805HF

Q1,2 : 2SA999(E,F)
Q3 : 2SC2003(L,K)
Q4~8 : 2SC945(A)(Q,P) or 2SC1740S(Q,R)

D1~5,13~17 : 1SS133 or HSS104
D8~12 : S5566B

IC1 : LC4966

Q1,2 : DTC124N
Q3 : DTA124N

D1~4 : HSS104 or ISS133
D5 : HSS104A or ISS131

(X89-101X-XX)
Q1~4,9,10,17 : 2SA992(F,E)
Q5~8,15,16 : 2SC1845(F,E)
Q11,12 : 2SC2590
Q13,14 : 2SA1110
Q18,19 : 2SC945(A)(Q,P)

D1,2,7 : 1SS176 or 1SS133
D3~6 : 1SS178 or 1SS131

━━━━ SIGNAL LINE
──── GND LINE
──── +B LINE
– – – – – -B LINE

A-82(E)(2/2)

CAUTION: For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list). ⚠ Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

DC voltages are as measured with a high impedance voltmeter, during reception of the FM broadcast signal (with a signal strength of 60 dB at the ANT terminal). Values may vary slightly due to variations between individual instruments or/and units.

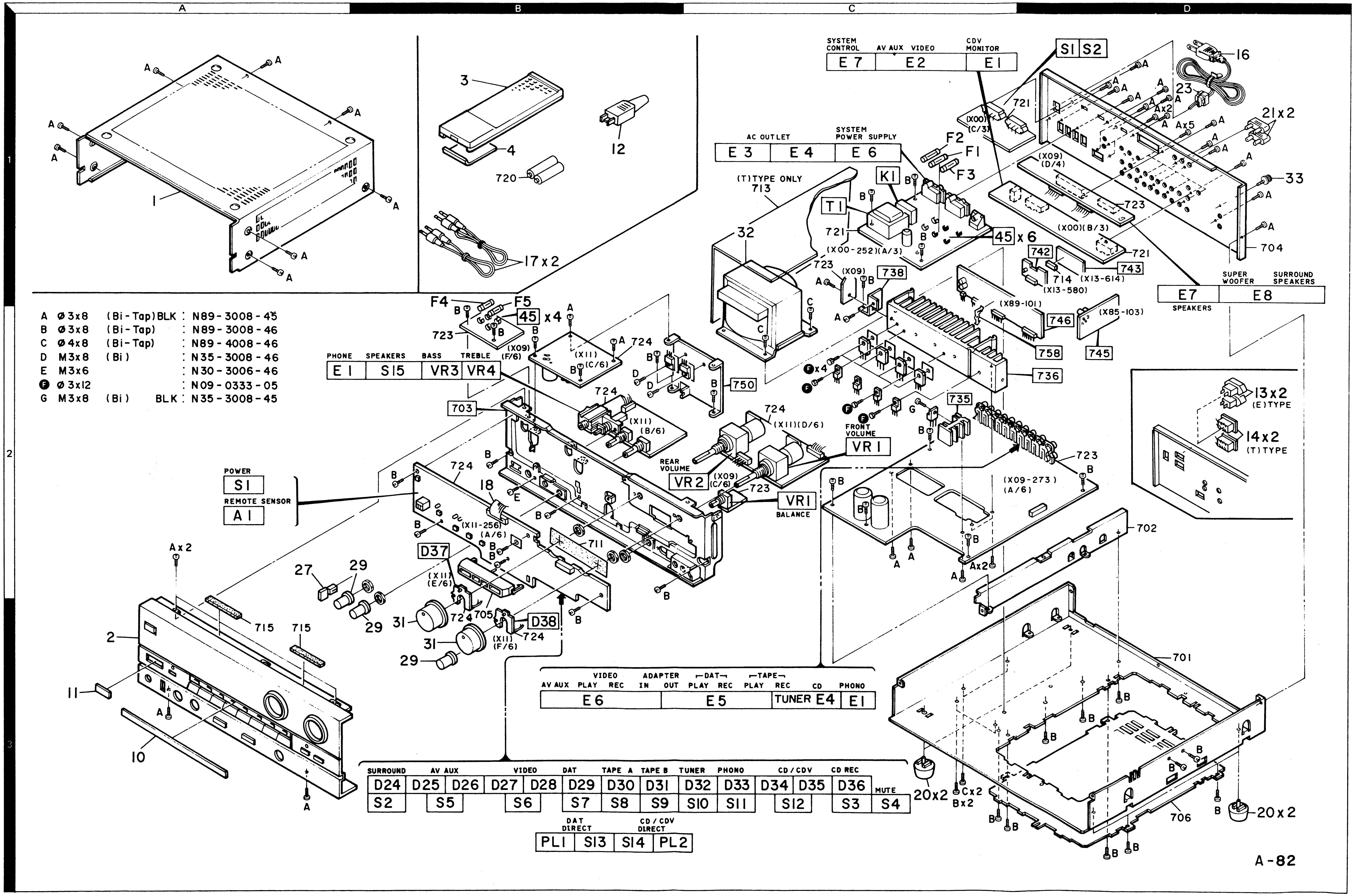
Les tensions c.c. doivent être measurées avec un voltmètre à haute impédance pendant la réception d'un signal de programme FM (avec une force der signal de 60 dB à la borne ANT). Les valeurs peuvent différer légèrement du fait des variations inhérentes aux appareils et aux instruments de mesure individuels.

Die angegebenen Gleichspannungswerte wurden mit einem hochohmigen Spannungsmesser bei Empfang eines UKW-Signals (mit einer Feldstärke von 60 dB am Antennenanschluß) gemessen. Dabei schwanken die Meßwerte aufgrunt von Unterschieden zwischen einzelnen Instrumenten oder Geräten u.U. geringfügig.

A-82

KENWOOD

EXPLODED VIEW



A
B
C
D
1
2
3
1
2
3
4
720
12
17x2
16
23
21x2
33
704
SYSTEM CONTROL
AV AUX
VIDEO
CDV MONITOR
E7
E2
E1
S1
S2
721
(X00)(C/3)
AC OUTLET
SYSTEM POWER SUPPLY
E3
E4
E6
F2
F1
F3
K1
T1
(T)TYPE ONLY
713
32
721
(X00-252)(A/3)
45 x 6
(X09)(D/4)
723
(X00)(B/3)
721
742
743
714 (X13-614)
(X13-580)
SUPER WOOFER
SURROUND SPEAKERS
E7
E8
SPEAKERS
723
(X09)
738
(X89-101)
746
(X85-103)
758
745
736
735
F4
F5
45 x4
723
(X09)(F/6)
(X11)(C/6)
724
PHONE
SPEAKERS
BASS
TREBLE
E1
S15
VR3
VR4
750
703
724
(X11)(B/6)
724
(X11)(D/6)
FRONT VOLUME
VR1
REAR VOLUME
VR2
(X09)(C/6)
723
VR1
BALANCE
723
(X09-273)(A/6)
13x2
(E)TYPE
14x2
(T)TYPE
POWER
S1
REMOTE SENSOR
A1
724
18
(X11-256)(A/6)
D37
711
(X11)(E/6)
705
D38
724
(X11)(F/6)
702
Ax2
701
A x 2
27
29
29
31
29
31
29
2
715
715
11
10
VIDEO
ADAPTER
DAT
TAPE
AV AUX
PLAY
REC
IN
OUT
PLAY
REC
PLAY
REC
CD
PHONO
E6
E5
TUNER E4
E1
SURROUND
AV AUX
VIDEO
DAT
TAPE A
TAPE B
TUNER
PHONO
CD / CDV
CD REC
D24
D25
D26
D27
D28
D29
D30
D31
D32
D33
D34
D35
D36
MUTE
S2
S5
S6
S7
S8
S9
S10
S11
S12
S3
S4
DAT DIRECT
CD / CDV DIRECT
PL1
S13
S14
PL2
20x2
Cx2
Bx2
706
20x2
A-82

A	Ø3x8	(Bi-Tap)	BLK	N89-3008-45
B	Ø3x8	(Bi-Tap)		N89-3008-46
C	Ø4x8	(Bi-Tap)		N89-4008-46
D	M3x8	(Bi)		N35-3008-46
E	M3x6			N30-3006-46
🅕	Ø3x12			N09-0333-05
G	M3x8	(Bi)	BLK	N35-3008-45

Parts with the exploded numbers larger than 700 are not supplied.

PARTS LIST

⁎ New Parts
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

	Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
	A-82						
	1	1A		A01-1681-01	METALLIC CABINET		
	1	1A	⁎	A01-1719-01	METALLIC CABINET		S
	2	2A	⁎	A20-5651-02	PANEL ASSY		
	3	1B	⁎	A70-0230-05	REMOTE CONTROLLER ASSY		J
	3	1B	⁎	A70-0247-05	REMOTE CONTROLLER ASSY		S
	4	1B		A09-0073-08	BATTERY COVER(REMOTE CONTROL)		S
	10	3A		B03-2472-04	DRESSING PLATE		
	11	3A		B03-2473-04	DRESSING PLATE		
	-			B46-0094-03	WARRANTY CARD	UUE	
	-			B46-0095-03	WARRANTY CARD	UUE	
	-			B46-0096-13	WARRANTY CARD	X	
	-			B46-0122-13	WARRANTY CARD	E	
	-			B46-0143-03	WARRANTY CARD	T	
	-		⁎	B50-9254-00	INSTRUCTION MANUAL(ENGLISH)		S
	-		⁎	B50-9255-00	INSTRUCTION MANUAL(FRENCH)	ME	S
	-		⁎	B50-9256-00	INSTRUCTION MANUAL(SPANISH)	M	S
	-		⁎	B50-9257-00	INSTRUCTION MANUAL(G,D)	E	S
	-		⁎	B50-9300-00	INSTRUCTION MANUAL(ENGLISH)		J
	-		⁎	B50-9301-00	INSTRUCTION MANUAL(FRENCH)	ME	J
	-		⁎	B50-9302-00	INSTRUCTION MANUAL(SPANISH)	M	J
	-		⁎	B50-9303-00	INSTRUCTION MANUAL(G,D)	E	J
	-		⁎	B50-9336-00	INSTRUCTION MANUAL(I)	E	J
	-		⁎	B50-9337-00	INSTRUCTION MANUAL(I)	E	S
	-		⁎	B52-0273-00	CONNECTING DIAGRAM		J
	-		⁎	B52-0284-00	CONNECTING DIAGRAM		S
	-			B58-0223-04	CAUTION CARD (PRE-SET 120V)	U	
	-			B58-0513-04	CAUTION CARD (PRESET220-240)	UE	
	-			B58-0803-13	CAUTION CARD	E	
	-			B59-0092-00	SERVICE DIRECTORY	UUE	
⚠	12	1B		E03-0049-05	AC PLUG	T	
⚠	13	2D		E03-0055-05	AC OUTLET	E	
⚠	14	2D		E03-0085-05	AC OUTLET	T	
⚠	16	1D		E30-0459-05	AC POWER CORD	E	
⚠	16	1D		E30-0812-05	AC POWER CORD	UUEM	
⚠	16	1D		E30-1341-05	AC POWER CORD	X	
⚠	16	1D		E30-1416-05	AC POWER CORD	T	
	17	1B		E30-1392-05	CORD WITH PLUG		
	18	2B		E31-4530-05	WIRING HARNESS		
⚠	F1 ,2			F06-2021-05	FUSE (SEMKO) (250V T2A)	XTE	
	F1 ,3			F05-3123-05	FUSE (250V 3. 15A)	UUEM	
⚠	F1 ,3			F06-1022-05	FUSE (SEMKO) (250V T1A)	XTE	
	F2		⁎	F05-1629-05	FUSE (250V 1. 6A)	UUEM	
⚠	F3			F05-3121-05	FUSE (SEMKO) (250V T3. 15A)	XTE	
⚠	F4 ,5			F06-2021-05	FUSE (SEMKO) (250V T2A)	XTE	
	-		⁎	H01-8344-04	ITEM CARTON CASE		S
	-		⁎	H01-8345-04	ITEM CARTON CASE		J
	-			H10-3708-02	POLYSTYRENE FOAMED FIXTURE		J
	-			H10-3709-02	POLYSTYRENE FOAMED FIXTURE		J
	-		⁎	H10-3735-02	POLYSTYRENE FOAMED FIXTURE		S
	-		⁎	H10-3736-02	POLYSTYRENE FOAMED FIXTURE		S
	-			H25-0224-04	PROTECTION BAG (800X400X0. 03)		

E: Scandinavia & Europe K: USA P: Canada
U: PX(Far East, Hawaii) T: England M: Other Areas
UE : AAFES(Europe) X: Australia

⚠ indicates safety critical components.

PARTS LIST

⁎ New Parts
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

	Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
	-			H25-0232-04	PROTECTION BAG (235X350X0. 03)		
	20	3D		J02-0366-15	FOOT		
	21	1D		J12-0091-05	PIN		
⚠	23	1D		J42-0083-05	POWER CORD BUSHING		
	-			J61-0307-05	WIRE BAND		
	27	3B		K27-1914-04	KNOB (BUTTON) SPEAKERS		
	29	3B		K29-2506-14	KNOB (BASS/TREBLE/BALANCE)		
	31	3B		K29-3291-04	KNOB (FRONT/REAR VOLUME)		
⚠	32	1C	⁎	L01-5442-05	POWER TRANSFORMER	XT	
⚠	32	1C	⁎	L01-5445-05	POWER TRANSFORMER	UUEM	
⚠	32	1C	⁎	L01-5448-05	POWER TRANSFORMER	E	
	33	1D		N08-0128-35	BINDING POST (GND)		
	IC1			M50461-057SP	IC(REMOTE CONTROLLER)		J
	POWER SUPPLY UNIT (X00-2520-22 : U, UE, M(J), 0-23:U, UE, M(S), 2-72: X, T, E(J), 2-73: X, T, E(S))						
	C1 ,2			CK45FB1H102K	CERAMIC 1000PF K		
	C4			C90-1334-05	NP-ELEC 47UF 10WV		
	C5 ,6			CE04KW0J471M	ELECTRO 470UF 6. 3WV		
	C7 ,8			C90-1334-05	NP-ELEC 47UF 10WV		
	C12			CE04KW1E102M	ELECTRO 1000UF 25WV		
	C13 ,14			CK45FF1H103Z	CERAMIC 0. 010UF Z		
	C15			CE04KW1V100M	ELECTRO 10UF 35WV		
⚠	C16			C91-0647-05	CERAMIC 0. 01UF P	XTE	
⚠	C16			C91-0971-05	FILM 0. 01UF 250WV	UUEM	
	C18 -20			CK45FF1H103Z	CERAMIC 0. 010UF Z		
	C21			CE04KW1E101M	ELECTRO 100UF 25WV		
	C22 ,23			CC45FSL1H820J	CERAMIC 82PF J		
	C24			CE04KW1H010M	ELECTRO 1. 0UF 50WV		
	E1	1C		E13-0297-05	PHONO JACK(CDV MONITOR)		
	E2	1C		E13-0309-05	PHONO JACK(AU AX VIDEO)		
⚠	E3 ,4	1C		E03-0095-05	AC OUTLET (4P)	UUEM	
	E6	1C		E08-0411-05	RECTANGULAR RECEPTACLE(POWER)		
	E7	1C		E11-0188-05	MINIATURE PHONE JACK(CONTROL)		
	45	1C		J13-0054-05	FUSE CLIP		
⚠	T1	1C	⁎	L01-5482-05	POWER TRANSFORMER	XTE	
⚠	T1	1C	⁎	L01-5483-05	POWER TRANSFORMER	UUEM	
	K1	1C		S51-1052-05	MAGNETIC RELAY		
⚠	S1 ,2	1C		S31-2131-05	SLIDE SWITCH (POWER TYPE)	UUEM	
	D1 -5			HSS104	DIODE		J
	D1 -5			1SS133	DIODE		
	D8 -12			S5566B	DIODE		
	D13 -15			HSS104	DIODE		J
	D13 -15			1SS133	DIODE		
	IC1			UPC7805HF	IC(VOLTAGE REGULATOR/ +5V)		
	Q1 ,2			2SA999(E,F)	TRANSISTOR		
	Q3			2SC2003(L,K)	TRANSISTOR		
	Q4 -8			2SC1923(R,O)	TRANSISTOR		
	AUDIO UNIT (X09-2730-22 : UUEMX(J), 0-23 : UUEX(S), 2-72 : TE(J), 2-73 : TE(S)						
	C1 -8			C91-0749-05	CERAMIC 220PF K	TE	
	C11 ,12			CC45FSL1H221J	CERAMIC 220PF J	TE	
	C13 -22			C91-0749-05	CERAMIC 220PF K	TE	

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C15 ,16			C91-0757-05	CERAMIC 0. 001UF K	UUEMX	
C23 ,24			CE04KW1H2R2M	ELECTRO 2. 2UF 50WV		
C25 ,26			CE04KW1H220M	ELECTRO 22UF 50WV		
C31 ,32			CC45FSL1H121J	CERAMIC 120PF J	TE	
C35 ,36			CE04KW1H010M	ELECTRO 1. 0UF 50WV		
C37 ,38			CF92FV1H153J	MF 0. 015UF J		
C39 -42			CK45FB1H391K	CERAMIC 390PF K		
C43 ,44			CF92FV1H222J	MF 2200PF J		
C45 ,46			CE04KW1H010M	ELECTRO 1. 0UF 50WV		
C47 ,48			CE04KW1V100M	ELECTRO 10UF 35WV		
C49 ,50			CE04KW1C470M	ELECTRO 47UF 16WV		
C53 ,54			CF92FV1H334J	MF 0. 33UF J		
C55 ,56			CF92FV1H473J	MF 0. 047UF J		
C57 ,58			CF92FV1H472J	MF 4700PF J	TE	
C59 ,60			CF92FV1H564J	MF 0. 56UF J		
C62			CK45FF1H472Z	CERAMIC 4700PF Z		
C63			CK45FE2H103P	CERAMIC 0. 010UF P		
C64			CK45FF1H103Z	CERAMIC 0. 010UF Z		
C65 ,66			CE04KW1V102M	ELECTRO 1000UF 35WV		
C67 -69			CE04KW1C470M	ELECTRO 47UF 16WV		
C70 ,71			CK45FE2H103P	CERAMIC 0. 010UF P		
C72 ,73			C90-1589-05	ELECTRO 6800UF 50WV		
C74			CE04KW1J100M	ELECTRO 10UF 63WV		
C76 ,77			CK45FF1H472Z	CERAMIC 4700PF Z		
C82			C91-0085-05	CERAMIC 0. 022UF N		
C85			CK45FF1H472Z	CERAMIC 4700PF Z		
C86			CE04KW1A101M	ELECTRO 100UF 10WV		
C87			CE04KW1C470M	ELECTRO 47UF 16WV		
C88 ,89			CF92FV1H564J	MF 0. 56UF J		
C91 ,92			CE04KW1C470M	ELECTRO 47UF 16WV		
C93 ,94			CC45FSL1H150J	CERAMIC 15PF J		
C95 ,96			CC45FSL1H050C	CERAMIC 5. 0PF C		
E1	3C		E13-0235-05	PHONO JACK (2P)		
E4	1C		E13-0621-05	PHONO JACK (6P)		
E5 ,6	3B,3C		E13-0814-05	PHONO JACK (8P)		
E7	1D		E20-0459-05	LOCK TERMINAL BOARD		
E8	1D		E13-0314-05	PHONO JACK		
L1 ,2			L39-0085-05	PHASE-COMPENSATION COIL		
F			N09-0333-05	TAPPING SCREW (3X12)		
CP1 ,2			R90-0187-05	MULTI-COMP 0. 22X2 K 5W		
R81 ,82			RD14AB2E330J	FL-PROOF RD 33 J 1/4W		
R85 ,86			RS14DB3D100J	FL-PROOF RS 10 J 2W		
R87 ,88			RD14AB2E100J	FL-PROOF RD 10 J 1/4W		
R107			RD14AB2E100J	FL-PROOF RD 10 J 1/4W		
R108			RD14AB2E332J	FL-PROOF RD 3. 3K J 1/4W		
R113			RS14DB3D121J	FL-PROOF RS 120 J 2W		
R114,115			RS14DB3D180J	FL-PROOF RS 18 J 2W		
VR1			R05-5025-05	POTENTIOMETER(BARANCE)		
S2			S31-2136-05	SLIDE SWITCH (POWER TYPE)		
		*	HSS104	DIODE		J
D1 -16			1SS133	DIODE		
D21 -44			1SS133	DIODE		

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D49 -53			S5566B	DIODE		
D55 -58			1SS133	DIODE		
D59			RBV-602LFA	DIODE		
D60			1SS133	DIODE		
IC1			TC9163N	IC(BILATERAL SWITCH X16)		
IC2			TC9164N	IC(16CH BILATERAL SELECTOR SW)		
IC3 -5			UPC4570C	IC(OP AMP X2)		
IC6			UPC7812HF	IC(VOLTAGE REGULATOR/ +12V)		
Q1 ,2		*	2SC4467*5	TRANSISTOR		
Q3 ,4		*	2SA1694*5	TRANSISTOR		
Q5 ,6			2SC4137(U,V)	TRANSISTOR		
Q7			2SA733(A)(Q,P)	TRANSISTOR		
Q7			2SA933S(Q,R)	TRANSISTOR		
Q8			2SB941	TRANSISTOR		
Q9			2SA733(A)(Q,P)	TRANSISTOR		
Q9			2SA933S(Q,R)	TRANSISTOR		
Q10			2SC2878(B)	TRANSISTOR		
Q11			2SA999(E,F)	TRANSISTOR		
CONTROL UNIT (X11-2560-21 : (J), 0-22 : (S))						
D24 -36			B30-0431-05	LED(LN21CPH)		
D37 ,38			B30-1012-05	LED(SLP-981C-50)		
PL1 ,2		*	B30-1260-05	LAMP		
C1			C91-0769-05	CERAMIC 0. 01UF M		
C2 ,3			CK45FF1H103Z	CERAMIC 0. 010UF Z		
C4			CF92FV1H104J	MF 0. 10UF J		
C5			CE04KW1E222M	ELECTRO 2200UF 25WV		
C6 ,7			CK45FF1H103Z	CERAMIC 0. 010UF Z		
C8			CE04KW1E222M	ELECTRO 2200UF 25WV		
C9 -12			CE04KW1H010M	ELECTRO 1. 0UF 50WV		
C13			CE04KW1V100M	ELECTRO 10UF 35WV		
C14			CC45FSL1H221J	CERAMIC 220PF J		
C15			CE04KW1V100M	ELECTRO 10UF 35WV		
C16			CC45FSL1H221J	CERAMIC 220PF J		
C17			CF92FV1H224J	MF 0. 22UF J		
C18 ,19			CE04KW1V100M	ELECTRO 10UF 35WV		
C20			CK45FF1H472Z	CERAMIC 4700PF Z		
C21			CF92FV1H224J	MF 0. 22UF J		
C22 ,23			CE04KW1V100M	ELECTRO 10UF 35WV		
C24			CE04KW0J471M	ELECTRO 470UF 6. 3WV		
C25			CK45FF1H472Z	CERAMIC 4700PF Z		
C26 ,27			CF92FV1H104J	MF 0. 10UF J		
C28			CE04KW1H4R7M	ELECTRO 4. 7UF 50WV		
C29 ,30			CF92FV1H104J	MF 0. 10UF J		
C31			CE04KW1H4R7M	ELECTRO 4. 7UF 50WV		
C32 ,33			C90-1333-05	NP-ELEC 22UF 10WV		
C34 ,35			CE04KW1V100M	ELECTRO 10UF 35WV		
C36 -39			CE04KW1H010M	ELECTRO 1. 0UF 50WV		
C40 -43			CF92FV1H473J	MF 0. 047UF J		
C44 ,45			CE04KW1C470M	ELECTRO 47UF 16WV		
C46 -49			CC45FSL1H331J	CERAMIC 330PF J		
C50 ,51			CK45FF1H103Z	CERAMIC 0. 010UF Z		
C52			CK45FB1H102K	CERAMIC 1000PF K		
C53 ,54			C90-1351-05	NP-ELEC 3. 3UF 50WV		
C58 ,59			C91-0769-05	CERAMIC 0. 01UF M		

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CN1			E10-1306-05	FLAT CABLE CONNECTOR		
E1	2B		E11-0162-05	PHONE JACK (3P)		
X1			L78-0209-05	RESONATOR (4.194MHZ)		
X1			L78-0218-05	RESONATOR		
CP1			R90-0805-05	MULTI-COMP 10KX8 J 1/4W		
R70 ,71			RS14DB3A820J	FL-PROOF RS 82 J 1W		
R74 ,75			RD14AB2E100J	FL-PROOF RD 10 J 1/4W		
R91			RS14DB3D331J	FL-PROOF RS 330 J 2W		
R93			RS14DB3D331J	FL-PROOF RS 330 J 2W		
R95			RS14DB3D331J	FL-PROOF RS 330 J 2W		
R97			RS14DB3D331J	FL-PROOF RS 330 J 2W		
R98 ,99			RS14DB3A2R7J	FL-PROOF RS 2.7 J 1W		
R113,114			RS14DB3A471J	FL-PROOF RS 470 J 1W		
VR1 ,2	2C		R29-5021-05	POTENTIOMETER(FRONT/REAR VOL)		
VR3 ,4	2B		R10-3038-05	POTENTIOMETER(BASS/TREBLE)		
S1 -14	3B,3C		S40-1064-05	PUSH SWITCH		
S15	2B		S40-4056-05	PUSH SWITCH (SPEAKERS)		
D1 ,2			HSS104	DIODE		
D1 ,2			1SS133	DIODE		
D6 -11			HSS104	DIODE		
D6 -11			1SS133	DIODE		
D13 -15			HSS104	DIODE		
D13 -15			1SS133	DIODE		
D16 ,17			HZS5.1N(B2)	ZENER DIODE		
D16 ,17			RD5.1ES(B2)	ZENER DIODE		
D20			KBP02ML-6127	DIODE		
IC1		*	CXP5016-315S	IC(MICROPROCESSOR)		
IC2			M51951ASL	IC(SYSTEM RESET)		
IC3 ,4			BA6109	IC(MOTOR DRIVER)		
IC3 ,4			LB1641	IC(MOTOR DRIVER)		
IC5 ,6			UPC1238V*1	IC(POWER AMP)		
IC7			UPC4570C	IC(OP AMP X2)		
Q5 ,6			2SC2003(L,K)	TRANSISTOR		J
Q5 ,6			2SC2320(E,F)	TRANSISTOR		
Q7 ,8			2SD1302(S,T)	TRANSISTOR		
Q9			2SA733(A)(Q,P)	TRANSISTOR		
Q9			2SA933S(Q,R)	TRANSISTOR		
Q10 ,11			2SD1302(S,T)	TRANSISTOR		
Q12			2SA733(A)(Q,P)	TRANSISTOR		
Q12			2SA933S(Q,R)	TRANSISTOR		
A1	2A		W02-0910-05	ELECTRIC CIRCUIT MODULE		
BAFA UNIT (X13-5800-00)						
C1 ,2			CE04KW1H2R2M	ELECTRO 2.2UF 50WV		
C3 ,4			CE04KW1V220M	ELECTRO 22UF 35WV		
IC1			UPC4570C	IC(OP AMP X2)		
SUB-CIRCUIT UNIT (X13-6140-00)						
C1 ,2			CC45FSL1H221J	CERAMIC 220PF J		
C3			CE04KW1H010M	ELECTRO 1.0UF 50WV		
D1 -4			HSS104	DIODE		
D1 -4			1SS133	DIODE		

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D5			HSS104A	DIODE		
D5			1SS131	DIODE		
IC1			LC4966	IC(CMOS LOGIC BILATERAL SW)		
Q1 ,2			DTC124EN	DIGITAL TRANSISTOR		
Q3			DTA124EN	DIGITAL TRANSISTOR		
PREAMPLIFIER UNIT (X85-1030-11: U, UE, M, X(J), 2-72: TE(J), X85-1110-10: U, UE, M, X(S), 2-71: T, E(S))						
C1 ,2			CE04FW1C100M	ELECTRO 10UF 16WV		
C3 ,4			CE04FW1A470M	ELECTRO 47UF 10WV		
C5			CF92FV1H123J	MF 0.012UF J		
C6			CF92FV1H123J	MF 0.012UF J		
C7			CF92FV1H332J	MF 3300PF J		
C8			CF92FV1H332J	MF 3300PF J		
C9 ,10			CE04KW1V100M	ELECTRO 10UF 35WV		
C11 ,12			CK45FF1H103Z	CERAMIC 0.010UF Z		
C15 ,16			CK45FB1H222K	CERAMIC 2200PF K	TE	
C15 ,16			CK45FB1H561K	CERAMIC 560PF K	UUEMX	
C17 ,18			CC45FSL1H101J	CERAMIC 100PF J	UUEMX	
C17 ,18			CC45FSL1H221J	CERAMIC 220PF J	TE	
IC1			AN6556	IC(OP AMP X2)		
IC1			AN6556	IC(OP AMP X2)		
IC1			M5218P	IC(OP AMP X2)		
IC1			M5218P	IC(OP AMP X2)		
MAIN AMPLIFIER UNIT (X89-1010-09: U, UE, M, X(J), 0-11: T, E(J)) **POWER AMPLIFIER UNIT (X07-2360-13: U, UE, M, X(S), 2-75: T, E(S))**						
C1 ,2			CE04KW1V100M	ELECTRO 10UF 35WV		
C3 ,4			CC45FSL1H221J	CERAMIC 220PF J		
C7 ,8			CC45FSL1H101J	CERAMIC 100PF J	TE	
C9 ,10			CC45FSL1H680J	CERAMIC 68PF J		
C11 -14			CC45FSL1H221J	CERAMIC 220PF J		
C15 ,16			CK45FF1H103Z	CERAMIC 0.010UF Z		
C17 ,18			CK45FB1H222K	CERAMIC 2200PF K		
C19 ,20			CE04KW1J221M	ELECTRO 220UF 63WV		
C21			CE04KW1E101M	ELECTRO 100UF 25WV		
C22			CE04KW1H2R2M	ELECTRO 2.2UF 50WV		
C23			CE04KW1C330M	ELECTRO 33UF 16WV		
C25 ,26			CC45FSL1H020C	CERAMIC 2.0PF C		
R13 ,14			RD14AB2E221J	FL-PROOF RD 220 J 1/4W		
R17 ,18			RD14AB2E221J	FL-PROOF RD 220 J 1/4W		
R23 ,24			RD14AB2E271J	FL-PROOF RD 270 J 1/4W		
R27 -30			RD14AB2E4R7J	FL-PROOF RD 4.7 J 1/4W		
R31 -34			RD14AB2E221J	FL-PROOF RD 220 J 1/4W		
R35 -38			RD14AB2E2R2J	FL-PROOF RD 2.2 J 1/4W		
R45 ,46			RD14AB2E101J	FL-PROOF RD 100 J 1/4W		
VR1 ,2			R12-1070-05	TRIMMING POT.(1K)		
D1 ,2			1SS133	DIODE		
D1 ,2			1SS176	DIODE		
D3 -6			1SS131	DIODE		
D3 -6			1SS178	DIODE		
D7			1SS133	DIODE		
D7			1SS176	DIODE		
Q1 -4			2SA992(F,E)	TRANSISTOR		
Q5 -8			2SC1845(F,E)	TRANSISTOR		
Q9 ,10			2SA992(F,E)	TRANSISTOR		
Q11 ,12			2SC2590	TRANSISTOR		

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Q13 ,14			2SA1110	TRANSISTOR		
Q15 ,16			2SC1845(F,E)	TRANSISTOR		
Q17			2SA992(F,E)	TRANSISTOR		
Q18 ,19			2SC945(A)(Q,P)	TRANSISTOR		

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A-82

SPECIFICATIONS

Amplifier (A-82)

Power Output

50 watts per channel minimum RMS, both channels driven, at 8 ohms from 20 Hz to 20,000 Hz with no more than 0.09% total harmonic distortion.

Maximum continuous output power (IEC) from 60 Hz to 12,500 Hz, 0.7% THD at 8 ohms	56 W + 56 W
Total Harmonic Distortion (20 Hz to 20,000 Hz 8 ohms)/	
At rated output	0.09%
At 1/2 rated output	0.04%
Intermodulation distortion	
(60 Hz: 7 kHz = 4:1)	0.02% at rated output into 8 ohms
Signal-to-Noise ratio (IHF-A)	
PHONO MM (2.5 mV)	74 dB
TUNER, AUX, TAPE PLAY	94 dB
Signal-to-Noise ratio at unweighted, 50 mW output (DIN)	
PHONO (MM)	55 dB
TUNER, AUX, TAPE PLAY	56 dB
Tone Control	
Bass	± 10 dB at 100 Hz
Treble	± 10 dB at 10 kHz
Damping Factor	60 at 50 Hz
Channel Separation (DIN) at 1,000 Hz	
PHONO (Terminated with 2.2 kΩ)	50 dB
AUX (Terminated with 47 kΩ + 250 pF)	50 dB
Input sensitivity/impedance	
PHONO MM	2.5 mV/47 kohms
TUNER, AUX., TAPE PLAY	150 mV/47 kohms

General

Power consumption	150 W
Dimensions	W: 360 mm (14-3/16") H: 129 mm (5 1/16") D: 368 mm (14-1/2")
Weight (Net)	8.3 kg (18.26 lb)

Remote control unit (RC-82)

Maximum remote-controllabel distance	6 m (on an axis of optical sensor)
Remote control system	Infrared control system
Battery for remote control unit	Size "AA" (R6) × 2

Note

Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on the Europe (E) standard, and provides information on regional circuit modification through use of alternate schematic diagrams, and information on regional component variations through use of parts list.

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